Baylor Scott & White
THE HEART HOSPITALS
CARDIOVASCULAR INSTITUTE
Joint ownership with physicians

Student Catalog
Class of 2025

Baylor Scott & White
The Heart Hospitals
Cardiovascular Institute
1100 Allied Drive, Ste. 5-504
Plano, TX 75093
Phone: 469.814.3600
Fax: 469.814.3609

Adult Echocardiography
Cardiovascular Perfusion
Invasive Cardiovascular Technology

Catalog Volume: 3.3
Published: March 27, 2024
Effective: March 28, 2024

This Student Catalog for Baylor Scott & White (BSW) The Heart Hospitals (THHs) Cardiovascular Institute (also referred to as the "Cardiovascular Institute" or "CVI" throughout this document) is current as of the publication date on the cover.

It may be necessary to make changes to the Catalog due to changes to the program curriculum, academic calendar, or school personnel. Additionally, requirements mandated by the Texas Workforce Commission – Career Schools and Colleges (TWC-CSC), new or updated recommendations from recognized societal guidelines, or the National Education Curriculum may require changes to this document for it to remain current.

Blood-borne pathogens, infectious diseases, and COVID-19 Policy:

The Cardiovascular Institute follows all active policies and procedures of Baylor Scott & White Health (BSWH) Universal Precautions for blood-borne pathogens and infectious diseases, including all measures necessary to prevent the spread of the current COVID-19 global pandemic. Students will be provided the education and all necessary personal protective equipment (PPE) to protect them from these infectious diseases in the clinical setting.

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School Founding and Honorary Awards

Paul A. Grayburn, MD

Founding Fathers of the Cardiovascular Institute

The founding of the **Baylor Scott & White (BSW) The Heart Hospitals Cardiovascular Institute** was made possible by the vision and determination of Paul A. Grayburn, MD. Dr. Grayburn has served Baylor Scott & White Health (BSWH) for over 18 years as the Paul J. Thomas Chair for Cardiology Research and Education, and as the Medical Director of Cardiology Research. He has worked extensively in defining the cause, severity and course of many valvular heart diseases while helping develop transcatheter interventional therapies to treat them. He pioneered a novel gene therapy delivery technique using sonicated microbubbles and ultrasonic imaging. He has volunteered countless hours to numerous writing groups which published guidelines documents to define best practices for both the assessment and treatment for valvular heart diseases.

In recognition of his efforts to establish this school and for his abundant contributions to the field of cardiology, the clinical skills laboratory where every student will learn to apply the crafts of their trade will be named the ***"Paul A. Grayburn BioSkills Laboratory"***.

To become a reality, Dr. Grayburn's concept needed support at the highest levels of a hospital's administration, and he found enthusiastic backing at BSW The Heart Hospital-Plano. When presented the concept of founding a school comprised of multiple Allied Health disciplines in early January of 2020, hospital president Mark A. Valentine quickly grasped the potential of Dr. Grayburn's vision and positive impact for the BSW Health Systems. With his trademark sense of urgency and aggressive pace toward project completion, President Valentine presented this opportunity at the February meeting with the hospital's Board of Managers. The Board of Managers agreed wholeheartedly with President Valentine and, despite a blooming worldwide COVID-19 pandemic, voted unanimously on March 23, 2020, to found BSW The Heart Hospitals Cardiovascular Institute.

President Mark A. Valentine, BS, MBA

For his pivotal role in making this school vision into a reality and for his unrelenting efforts in constantly refining the BSW Health System to improve patient care and outcomes, an annual student award has been named in his honor. The *"**Mark A. Valentine Outstanding Student Award**"* is awarded by each Program Director to the student who most personifies academic excellence, personal integrity, and leadership skills in both in the classroom and clinical settings.

Dr. Grayburn and President Valentine are the founding fathers of this first-ever school-of-its-kind within the BSW Health System, and its establishment is a direct result of their determination and courage. Countless patients and students will benefit from their efforts for decades to come.

2020 Founding Board of Managers, Baylor Scott & White The Heart Hospital-Plano

President Valentine extends his deepest gratitude to the Board of Managers for their unwavering support and dedication to the founding of *BSW The Heart Hospitals Cardiovascular Institute.* Without the faithful support of the Board, this school could not have become a reality.

"We are in it together!"

George McCleskey, Chairman of the Board

Alejandro C. Arroliga, MD, MSc

Jonathan Cantwell, MBA

Scott Peek, FACHE, MSHA

Brett Stauffer, MD, MHS, FHM

Sarah Gahm, MHA

Dennis Gable, MD, RVT, FACS

David L. Brown, MD, FACC, FACP

Marc Shalek, MD

Adam R. Shapira, MD, FACC, FHRS

Robert L. Smith, MD

William T. Brinkman, MD

Cardiovascular Institute Administration

Mark A. Valentine, BS, MBA is Chief Executive Officer of the Cardiovascular Institute and President of BSW The Heart Hospitals-Plano, Denton, and McKinney. He also serves as co-leader of the Cardiovascular Service Line for the BSW Health system. Since January 2006, President Valentine has been instrumental in growing and expanding the advanced services of The Heart Hospitals. As a result, the hospital is recognized as one of the top 10 largest heart surgery centers in the country, the largest cardiothoracic surgery program in Texas, and the busiest heart surgery center in the Dallas-Fort Worth Metroplex. In March 2020, and for the second year in a row, *BSW The Heart Hospital-Plano* has been recognized as one of the ***"World's Best Hospitals 2020"*** by ***Newsweek***. This achievement recognizes the best medical institutions across 21 countries. Under President Valentine's leadership, the hospital has received numerous national awards and recognition. BSW The Heart Hospital – Plano ranked 27th in the Nation for Cardiology and Heart Surgery by U.S. News & World Report, including "*High Performing*" in five types of care and 2019 Physician Hospital of the Year by Physician Hospital of America. Baylor Scott & White The Heart Hospital – Denton received three "*High Performing*" types of care by U.S. News & World Report. President Valentine's proven ability to utilize resources to bring a vision to fruition range from leading a strategic expansion into new markets to founding this hospital-based Allied Health career school.

J. Michael DiMaio, MD is Medical Director of the Cardiovascular Institute and serves as Chief-of-Staff for BSW The Heart Hospitals-Plano, -Denton and -McKinney. Dr. DiMaio has over 30 years of experience in cardiothoracic surgery, research, and education at academic centers.

Dr. DiMaio received his medical degree from the University of Miami in 1987 and completed his internal medicine, general and thoracic surgery residencies at Duke University Medical Center. While at Duke, Dr. DiMaio completed a NIH sponsored research fellowship focused on gene therapy, immunology, and transplantation. He joined the faculty at UT Southwestern in 1998 and rose to the rank of Professor with a Distinguished Chair in cardiac research. He has held grants and contracts from the NIH, DOD, HHS and the NSF. His clinical interests include transplantation, cardiac surgery, ventricular aneurysm repair, aortic stenting, minimally invasive cardiac and thoracic surgery, and the usage of Holmium-YAG laser therapy for tracheal and thoracic obstructive processes. Dr. DiMaio currently oversees clinical research projects focused on cardiac and thoracic research and has studied the effects of protein and pharmacologic agents involved with myocardial and neurological recovery. Dr. DiMaio serves on the editorial boards of several medical journals as well as leadership positions in national and international societies. Since coming to the Heart Hospitals, he has continued to build upon the outstanding research conducted on campus and expanded the educational opportunities.

Brad J. Roberts, BS, ACS, FASE is the Director of the Cardiovascular Institute and Program Director of the school's first program – Adult Echocardiography. His role has been instrumental in both founding the Cardiovascular Institute and in establishing new Allied Health programs. Since the school began with its first class of five Adult Echocardiography students in 2020, Mr. Roberts has guided the startup, state licensure, and national accreditation of one new program per year for a total of three Allied Health education programs as of 2023. He will continue to work closely with Mr. Valentine and Dr. DiMaio to ensure its programs remain innovative, current, and accredited with the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

Program Faculty and Administrative Support

Brad J. Roberts, BS, ACS, FASE
Director, Cardiovascular Institute
Program Director, Adult Echocardiography

Dr. Zuyue Wang
Adjunct Faculty and Instructor, Adult Echocardiography
Regional Medical Director, BSW Non-Invasive Cardiology

Altaf Panjwani, MS, MBA, CCP, LCP
Program Director, Cardiovascular Perfusion
CV Perfusionist, BSW The Heart Hospital-Plano

Dr. Kelley Hutcheson
Adjunct Faculty and Instructor, Cardiovascular Perfusion
Cardiothoracic Surgeon, BSW The Heart Hospital-Plano

Kyle Ellington, AAS, RCIS
Program Director and Clinical Coordinator,
Invasive Cardiovascular Technology

Dr. Srinivasa Potluri
Adjunct Faculty and Instructor, Invasive CV Technology
Chief of Cardiology, BSW The Heart Hospital-Plano

Alessandro Lione, MBA, CCP, RRT
Clinical Director and Instructor, Cardiovascular Perfusion
Dir. of Surgical Services, BSW The Heart Hospital-Plano

Julie Britain, BS, RCS, RDCS
Clinical Coordinator and Instructor, Adult Echocardiography
Cardiac Sonographer, Center for Advanced CV Care (CACC)

Paige Willis, MS, CCP, LCP
Instructor, Cardiovascular Perfusion
CV Perfusionist, BSW The Heart Hospital-Plano

Amy Harper, CMAA
Administrative Assistant, Cardiovascular Institute

Dity Varughese
Administrative Assistant, Cardiovascular Perfusion

Introduction

Welcome Students!

It is a pleasure to welcome you as a student to the Cardiovascular Institute! We are thrilled you have chosen our school for your career path and look forward to providing you with an outstanding educational experience. The Cardiovascular Institute was founded on March 23, 2020, by unanimous vote from the Board of Managers of *BSW The Heart Hospital-Plano,* located at 1100 Allied Drive in Plano, Texas. This 114-bed hospital specializes in advanced cardiothoracic surgical techniques and transcatheter cardiovascular therapies, including minimally invasive robotic surgery and transcatheter valvular implantation. *BSW The Heart Hospital-Plano* serves as the home campus for the *Cardiovascular Institute* and also serves as one of its largest clinical internship sites.

From 2020-2022, *BSW The Heart Hospital-Plano* earned distinguished three-star ratings from The Society of Thoracic Surgeons (STS) for its patient care and outcomes in *five separate categories* – Isolated aortic valve replacement surgery (AVR), isolated coronary bypass surgery (CABG), AVR plus CABG surgery, mitral valve repair or replacement (MVRR), and MVRR plus CABG. The three-star STS rating, which is one of the most sophisticated and highly regarded overall measures of quality in healthcare, places *BSW The Heart Hospital Plano* among the top 1% of the most elite centers for cardiac surgery in the United States and Canada.

BSW The Heart Hospital – Plano was recognized as one of the World's Best Hospitals by Newsweek. The hospital ranked #50 in the nation for Cardiology & Heart Surgery in the U.S. News & World Report Best Hospitals list and achieved "High Performing" in five types of care: Abdominal Aortic Aneurysm Repair, Aortic Valve Surgery, Heart Bypass Surgery, Congestive Heart Failure and Lung Cancer Surgery.

The *Cardiovascular Institute* utilizes multiple BSWH facilities for clinical internship training with a *1:1 clinical instructor to student ratio*, which provides an excellent clinical education for each student. The school maintains experienced instructors, state-of-the-art audiovisual equipment, dedicated skills labs, and classrooms. These educational tools, combined with a challenging didactic schedule and real-world clinical experience, make the Cardiovascular Institute a competitive choice for professional education in the Allied Health field.

State Licensing of the School

The Cardiovascular Institute is approved and regulated by the Texas Workforce Commission, Career Schools and Colleges, Austin, Texas, school number S5753.

Texas Workforce Commission
Career Schools and Colleges
101 East 15th Street, Room 226T
Austin, Texas 78778-0001
(512) 936-3100
https://twc.texas.gov/partners/career-schools-colleges-resources

School Facilities and Equipment

The Cardiovascular Institute

The Cardiovascular Institute office and lounge are located on the 5th floor of BSW The Heart Hospital Plano, suite 5-504. There are multiple classrooms, learning areas and labs on both the 5th and 1st floors of the hospital, each equipped with modern audiovisual equipment and whiteboards. All learning areas are located adjacent to one another on each floor with restrooms and elevators nearby. The hospital also contains multiple state-of-the-art operating rooms and cardiac catheterization labs where the latest cardiovascular techniques, therapies and devices are implemented in patient care.

5th Floor Facilities and Equipment

1. Bio Skills Lab (Room 5-220A)
   The Bioskills Lab is a multipurpose room used for didactic lecture, ultrasound scan labs, and other educational activities. The room is fully reconfigurable and contains six adjustable-height stainless steel tables on casters and moveable chairs.
   - **Capacity:** 12 people in classroom chairs, can be rearranged
   - **Dimensions:** 37’ wide by 28’ deep
   - **Audiovisual:** 80" main display, 70” side display, confidence monitor, wired video inputs on wall, phone conferencing (not advisable due to acoustics)

2. Auditorium Rooms A/B (Room 5-210 A/B)

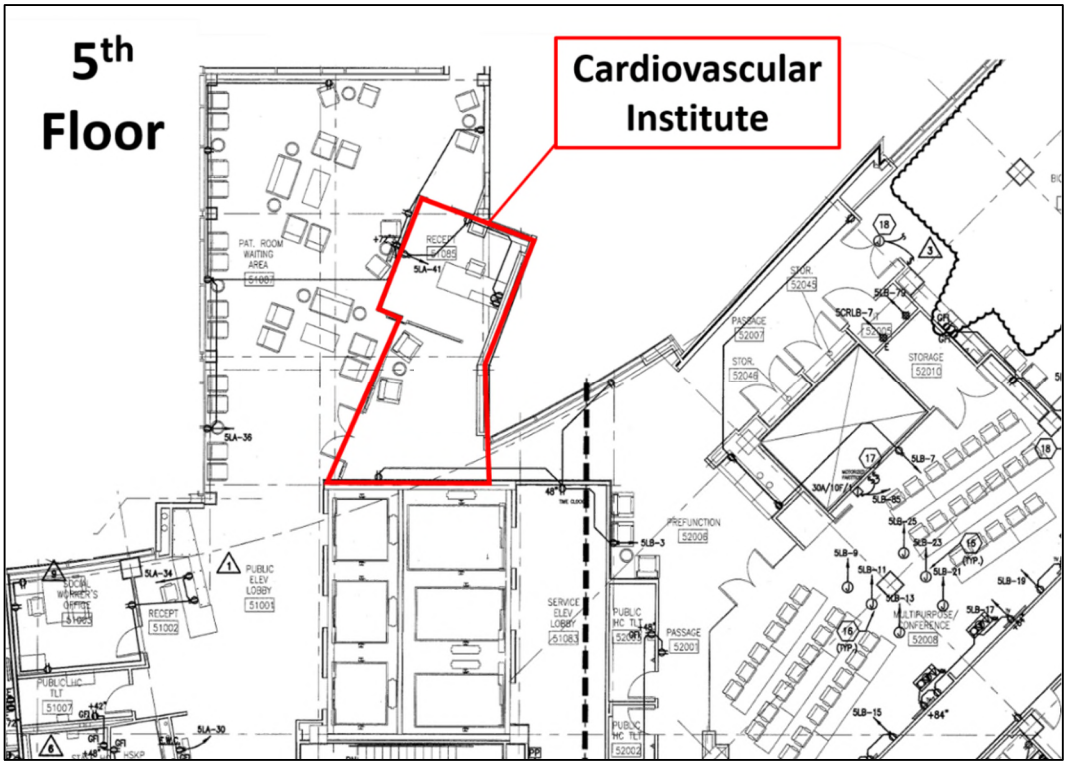
   Room A (Closest to window)
   - **Capacity:** 18 seats, classroom style with movable tables and chairs
   - **Dimensions:** 29’ wide by 22’ deep
   - **Audiovisual:** Video projector with 120” screen, confidence monitors, laptop connections and BSWH PC at lectern, videoconferencing, phone conferencing, wireless and wired microphones, video recording available

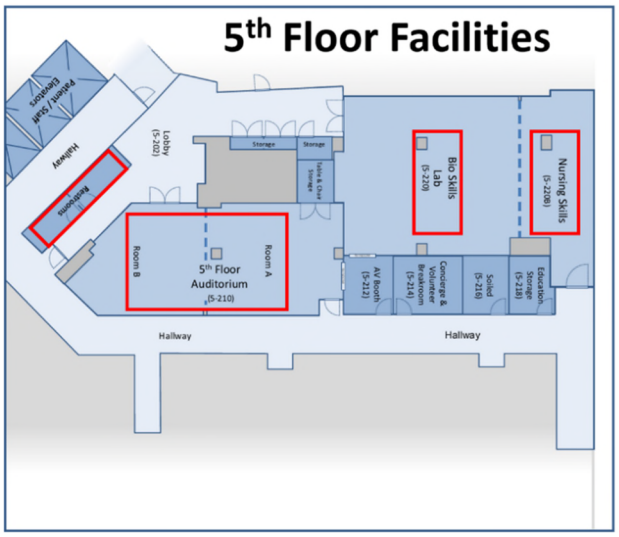
   Room B (Closest to glass doors)
   - **Capacity:** 18 seats, classroom style with movable tables and chairs
   - **Dimensions:** 21’ wide by 22’ deep
   - **Audiovisual:** Video projector with 120” screen, confidence monitor, laptop connections and BSWH PC at lectern, wireless and wired microphone

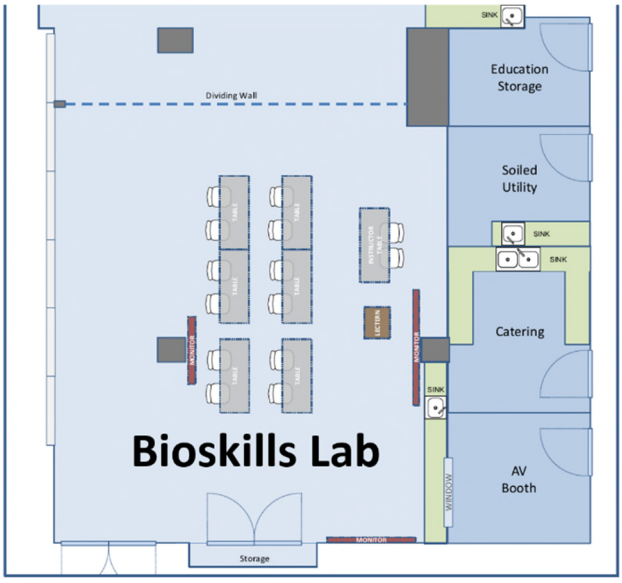
   Combined
   - **Capacity:** 36 seats, classroom style with movable tables and chairs
   - **Dimensions:** 40’ wide by 22’ deep
   - **Audiovisual:** Two, video projectors with 120” screens, laptop connections and BSWH PC at lectern, multiple fixed and wireless laptop inputs, Cisco videoconferencing, phone conferencing, wireless and wired microphones, video recording available

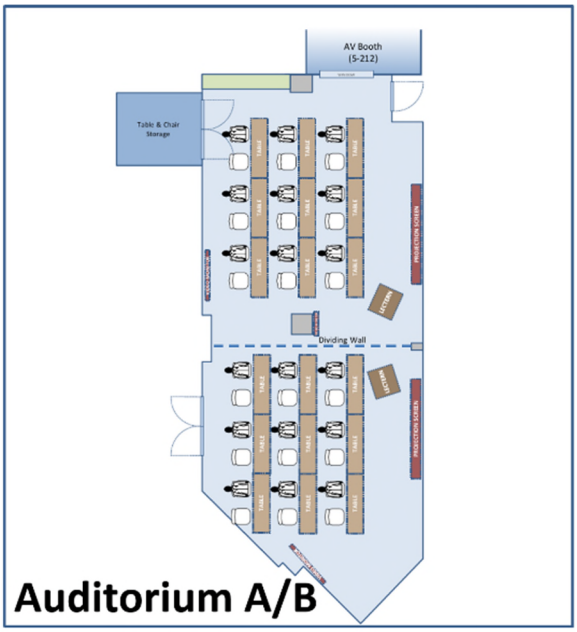
Two unisex, single-person restrooms are located in the lobby outside the Auditorium and Bio Skills Lab.

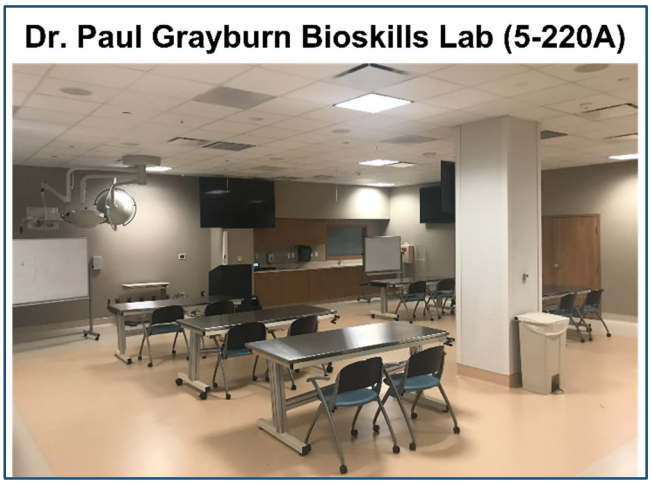
5th Floor Classroom and Lab

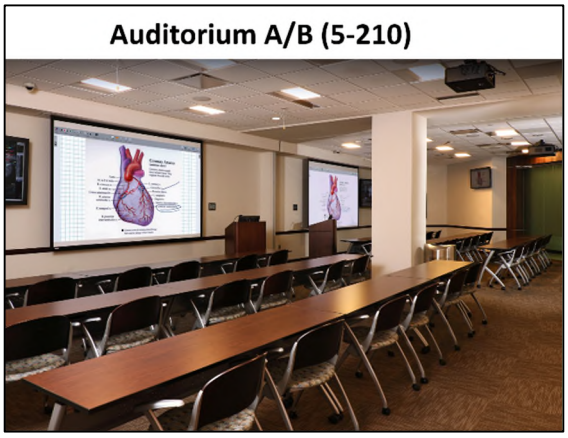



5th Floor Facilities
Patient / Staff Elevators
Hallway
Restrooms
Lobby (5-202)
Storage
Storage
Table & Chair Storage
Bio Skills Lab (5-220)
Nursing Skills (5-220E)
Room B
5th Floor Auditorium (5-210)
Room A
AV Booth (5-212)
Concierge & Volunteer Breakroom (5-214)
Soiled (5-216)
Education Storage (5-218)
Hallway
Hallway


SINK
Education Storage
Dividing Wall
Soiled Utility
SINK
SINK
Catering
INSTRUCTOR TABLE
LECTERN
MONITOR
MONITOR
SINK
Bioskills Lab
AV Booth
WINDOW
Storage
MONITOR


AV Booth (5-212)
Table & Chair Storage
Dividing Wall
LECTERN
Auditorium A/B


Dr. Paul Grayburn Bioskills Lab (5-220A)


Auditorium A/B (5-210)

1st Floor Classroom and Lab

1. Bioskills Lab (Room# 1-880)
    - The Bioskills Lab is a multipurpose room used for didactic lecture, ultrasound scan labs, and other educational activities. The room is fully reconfigurable and contains 10 adjustable-height stainless steel tables on casters and moveable chairs and stools.
    - **Capacity:** 32 persons on stools or 12 persons on classroom chairs
    - **Dimensions:** 34’ wide by 37’ deep
    - **Audiovisual:** Four, 75" wall-mounted displays, both wired and wireless PC connectivity, BSW-issued PC, wireless microphones and recording equipment.

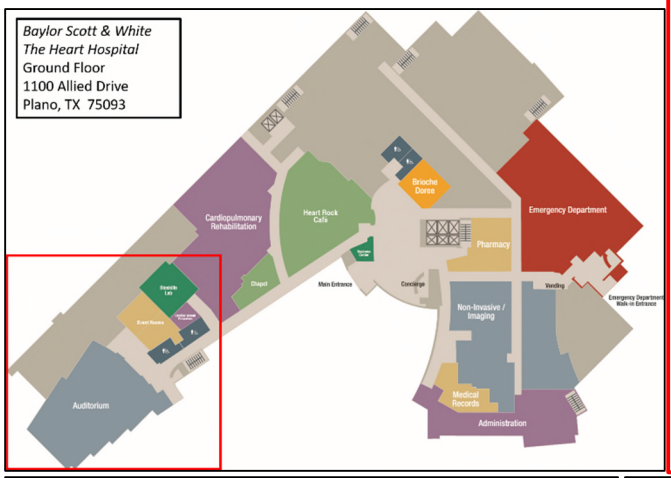
2. Event Rooms A/B (Room #s 1-920 A & B)
   Event rooms A/B are multi-use rooms that can remain open as one room or become partitioned in two, front-to-back, by a hidden wall divider.

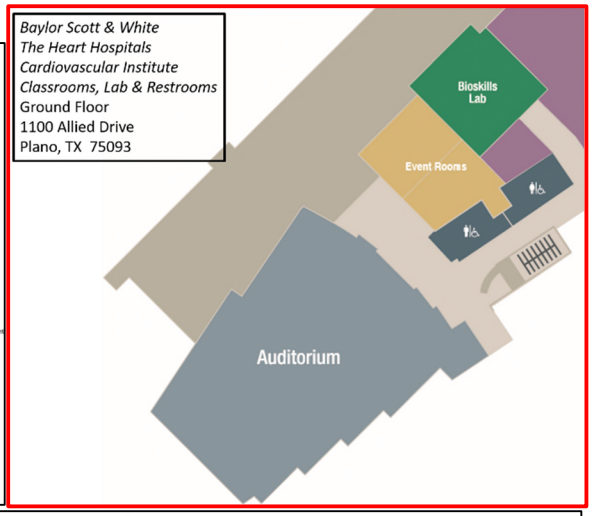
   Room A:
    - **Capacity:** 12 tables, 24 seats, classroom style, can be rearranged (can be increased to 15 tables and 30 seats if needed, but not advised)
    - **Dimensions:** 22’ wide by 29’ deep
    - **Audiovisual:** 90" display, 75" confidence monitor, laptop connection & BSWH PC at lectern, wireless laptop inputs, phone conferencing, wireless microphones

   Room B:
    - **Capacity:** 11 tables, 22 seats, classroom style, can be rearranged (can be increased to 14 tables and 28 seats if needed, but not advised)
    - **Dimensions:** 20’ wide by 29 feet deep
    - **Audiovisual:** 90" display, laptop connection & BSWH PC at lectern, wireless laptop inputs, Cisco videoconferencing, phone conferencing, wireless microphones, video recording available

3. David L. Brown Auditorium (Room# 1-930)
   The David L. Brown Auditorium is a large, multilevel auditorium
    - **Capacity:** 187 seats, lecture hall style with fixed desks and moveable seating
    - **Dimensions:** 67 feet wide by 70 feet deep
    - **Audiovisual:** 32ft x 9ft LED video wall, laptop connections and BSWH PC at lectern, multiple fixed and wireless laptop inputs, Cisco videoconferencing, phone conferencing, wireless and wired microphones, video recording available

Restrooms are located in the lobby outside the Auditorium and Event Rooms A/B.





1st Floor Bioskills Lab

Event Rooms A/B

Dr. David Brown Auditorium

Dr. David Brown Auditorium

2nd Floor Operating Rooms (OR) and Equipment

OR 1: A state-of-the-art AV system installed in 2007. Basic routing of in-room devices to wall and boom monitors.

OR 2: A state-of-the-art AV system installed in 2007. Basic routing of in-room devices to wall and boom monitors.

OR 3: A state-of-the-art AV system installed in 2007. Basic routing of in-room devices to wall and boom monitors.

OR 4: Recently updated to Karl Strorz OR 1 video integration system. Routing of in-room devices to wall and boom monitors. Video recording of any (one) source.

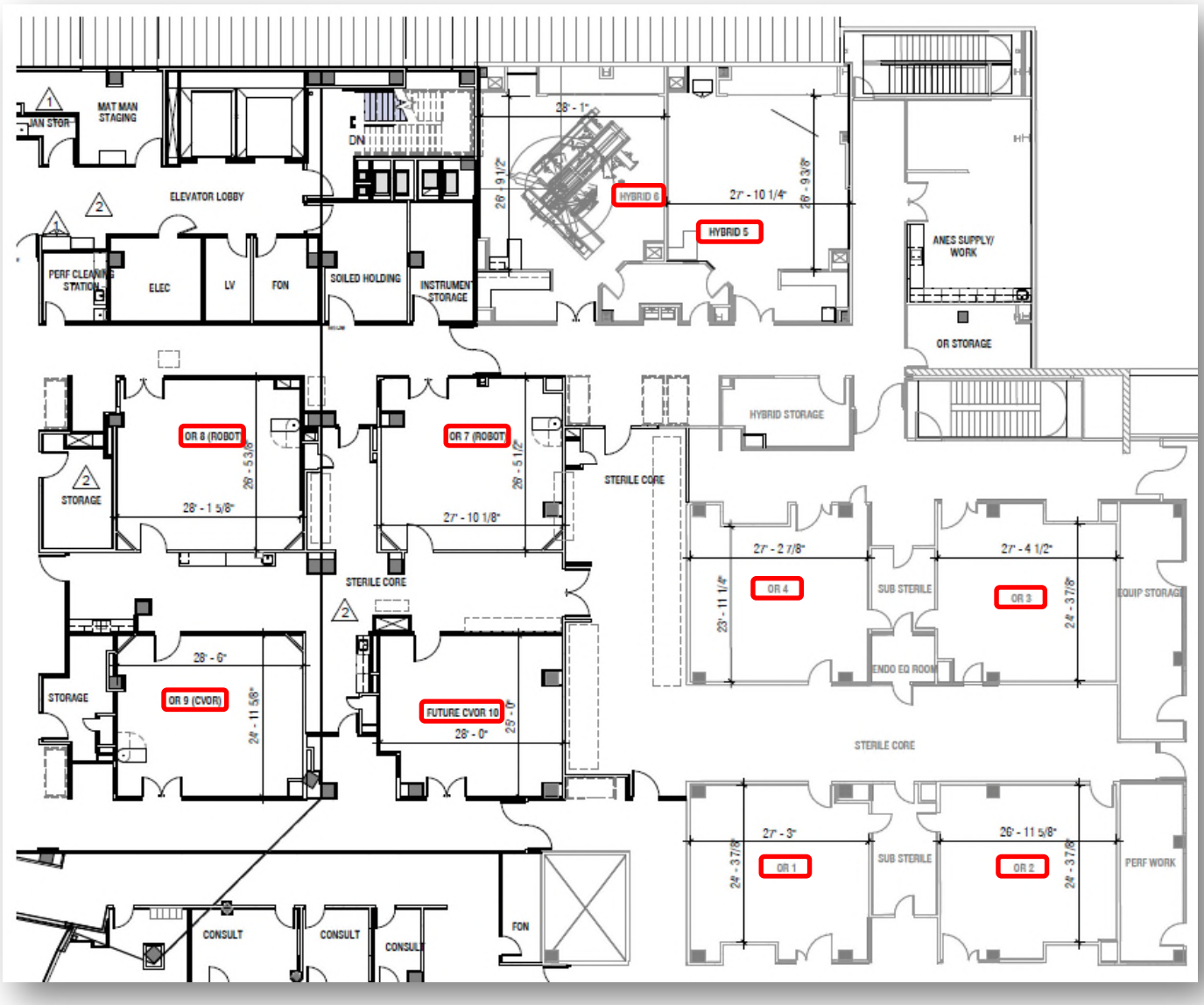
OR 5: Karl Storz OR5 video integration systems combined with imaging system control. Routing of in-room devices to wall and boom monitors. Multi-window display system located on boom over the bed. Video recording of sources. Video conferencing/streaming.

OR 6: Karl Storz OR5 video integration systems combined with imaging system control. Routing of in-room devices to wall and boom monitors. Multi-window display system located on boom over the bed. Video recording of sources. Video conferencing/streaming.

OR 7: Karl Storz OR5 video integration systems combined with imaging system control. Routing of in-room devices to wall and boom monitors. Multi-window display system located on boom over the bed. Video recording of sources. Video conferencing/streaming.

OR 8: Karl Storz OR5 video integration systems combined with imaging system control. Routing of in-room devices to wall and boom monitors. Multi-window display system located on boom over the bed. Video recording of sources. Video conferencing/streaming.

OR 9: Karl Storz OR5 video integration systems combined with imaging system control. Routing of in-room devices to wall and boom monitors. Multi-window display system located on boom over the bed. Video recording of sources. Video conferencing/streaming.


MAT MAN STAGING
JAN STOR
ELEVATOR LOBBY
PERF CLEANING STATION
ELEC
LV
FON
SOILED HOLDING
INSTRUMENT STORAGE
DN
28' - 1"
26' - 9 1/2"
HYBRID 6
27' - 10 1/4"
26' - 9 3/8"
HYBRID 5
ANES SUPPLY/ WORK
OR STORAGE
HYBRID STORAGE
OR 8 (ROBOT
26' - 5 3/8"
28' - 1 5/8"
STORAGE
OR 7 (ROBOT
26' - 5 1/2"
27' - 10 1/8"
STERILE CORE
27' - 2 7/8"
OR 4
23' - 11 1/4"
SUB STERILE
27' - 4 1/2"
OR 3
24' - 3 7/8"
EQUIP STORAGE
ENDO EQ ROOM
28' - 6"
STORAGE
OR 9 (CVOR)
24' - 11 5/8"
FUTURE CVOR 10
28' - 0"
29' - 0"
STERILE CORE
27' - 3"
OR 1
24' - 3 7/8"
SUB STERILE
26' - 11 5/8"
OR 2
24' - 3 7/8"
PERF WORK
CONSULT
CONSULT
CONSULT
FON

4th Floor Invasive Cardiology Rooms and Equipment

Cath Lab 1: Philips Medical single plane fluoroscopic unit.

Cath Lab 2: Philips Medical single plane fluoroscopic unit.

Cath Lab 3: General Electric single plane fluoroscopic unit.

Cath Lab 4: General Electric single plane fluoroscopic unit.

Program Tuition, Fees, and Payment Schedule (All Programs)

The program application fee is $100.00 for each program. Application fees are non-refundable and must be paid electronically through the online application portal.

Program tuition and all included components vary by program and are detailed in this section of the Student Catalog.

Adult Echocardiography Program Tuition and Fees

The cost of the Adult Echocardiography program is $22,000.00. Program tuition includes:

1. All administrative fees, lab fees, and required textbooks,
2. Baylor Scott & White laptop for school use (returned upon graduation),
3. Four (4) sets of black hospital scrubs embroidered with the school logo,
4. Embroidered school backpack, and
5. Upon successful completion of the program, examination fee reimbursement for either the Cardiovascular Credentialing International® (CCI®) ***or*** American Registry of Diagnostic Medical Sonographers® (ARDMS®) national credentialing examination for adult echocardiography.

Cardiovascular Perfusion Tuition and Fees

The cost of the Cardiovascular Perfusion program is $32,000.00. Program tuition includes:

1. All administrative fees, lab fees, and required textbooks,
2. Baylor Scott & White laptop for school use (returned upon graduation),
3. 1-year student membership to the American Society of Extracorporeal Technology (AMSECT), which includes access to its respected journal and members-only website content.

Invasive Cardiovascular Technology Tuition and Fees

The cost of the Invasive Cardiovascular Technology program is $22,000.00. Program tuition includes:

1. All administrative fees, lab fees, and required textbooks,
2. Baylor Scott & White laptop for school use (returned upon graduation),
3. 4 sets of black hospital scrubs embroidered with the school logo,
4. 1-year membership to the Alliance of Cardiovascular Professionals (ACVP) which includes access to its members-only website content,
5. Upon successful completion of the program, examination fee reimbursement for the CCI national credentialing examination for Invasive Cardiovascular Technology.

Tuition Payment Schedule

The first one-half of tuition for all programs is due by August 15th of each year*. The entire balance may be paid at this time if the student chooses to do so.

The second half of tuition for all programs is due by March 1st of the spring semester.

Tuition must be received by the school on or before these due dates. Failure to pay tuition by the first due date may forfeit a student's acceptance into the program and cause them to lose their

seat. Failure to make the second deadline on March 1 may lead to suspension or expulsion from the program. If expelled from the program, the student may be due a refund, which will be dispersed as directed by the Texas Workforce Commission-Career Schools and Colleges and defined in the Refund Policy section of this Student Catalog.

*****_Exceptions to the payment schedule may be made on a case-by-case basis for a student formally accepted into a CVI program who is experiencing financial hardship._

Cardiovascular Institute Academic Calendar

2024-2025 Academic Calendar

The Cardiovascular Institute reserves the right to revise these dates as needed. Notices of any changes will be issued to students, faculty, and staff with as much lead-time as possible.

*Semester dates and holidays are in **bold**.*

Date	Event
August 15, 2024	Fall Tuition Payment Due
Friday, August 23, 2024	Class of 2024 Graduation/Conferral Date
Monday, September 2, 2024	Labor Day Holiday [NO classes]
Tuesday, September 3, 2024	Fall semester-START
September 6, 2023	Last day to receive 100% refund for complete withdrawal
	Future withdrawal refunds calculated per Texas state law (TWC-CSC)
Wednesday, November 20, 2024	Thanksgiving Holiday – START [NO classes]
Monday, November 25, 2024	Thanksgiving Holiday – END [Classes resume]
Saturday, December 14, 2024	Christmas/Winter Break Holiday – START [NO classes]
Tuesday, December 30, 2024	Christmas/Winter Break Holiday – END [Classes resume]
Wednesday, January 1, 2025	New Year's Day Holiday [NO classes]
March 1, 2025	Spring Tuition Payment Due
Saturday, March 8, 2025	Spring Break – START [NO classes]
Monday, March 17, 2025	Spring Break – END [Classes resume]
Saturday, April 26, 2025	Summer Break – START [NO classes]
Monday, May 12, 2025	Summer Break – END [Classes resume]
Monday, May 26, 2025	Memorial Day Holiday [NO classes]
Friday, July 4, 2025	Independence Day Holiday [NO classes]
Friday, August 22, 2025	Class of 2025 Graduation/Conferral date

School Hours of Operation, Holidays and Break Periods

The Cardiovascular Institute hours of operation are 8:00am to 3:30pm weekdays, except for Baylor Scott & White Health recognized holidays and school breaks. The yearly school break schedule will be announced as soon as possible.

Admissions Policy

Non-Discrimination

The school will encourage an atmosphere that is respectful and supportive of every individual. This includes ensuring that all student-related actions and all employment actions be made without regard to

race, ethnicity, color, national origin, religion, sex, disability, veteran status, age, genetic information, sexual orientation, gender identity, or any other protected characteristic under applicable law.

General Admission Requirements (All Programs)

Admission to the Cardiovascular Institute is a competitive process and a limited number of applicants are accepted each year. The student should demonstrate a dependable, mature demeanor and interact well with others. The student should have a genuine desire to care for the disabled and sick and have the ability to work well under pressure. As indicated on the online application form, it is a **requirement** that accepted applicants for all programs undergo a criminal background check and urinalysis drug screening prior to enrollment. The costs for the background check and drug screening will be covered by the Cardiovascular Institute. A positive drug test result and/or significant criminal history report may deny the applicant enrollment into a program.

The application process is open to applicants who meet all the following minimum criteria at the time of program commencement. **Please note that there may be additional admissions requirements for each CVI program.** Please see the section on **Program-Specific Admissions Requirements**.

1. 18 years of age or older
2. Proof of United States citizenship or permanent residency status.

   Please note: The Cardiovascular Institute is not a college or university, which are degree-conferring, and therefore cannot sponsor Student Visa Applications. All applicants to the Cardiovascular Institute must either be a United States citizen or have obtained Permanent Residency status in the United States.

3. Minimum education requirements:
   a. **Adult Echocardiography** – Associate degree, Anatomy & Physiology I and II
      Preferred: Bachelor's degree or higher, Anatomy & Physiology I and II within 5 years, medical terminology
   b. **Cardiovascular Perfusion** – Bachelor's degree, specified prerequisite coursework must be completed from an accredited college or university in the United States (U.S.)
   c. **Invasive Cardiovascular Technology** – Associate degree
      Preferred: Bachelor's degree or higher, Anatomy & Physiology I and II within 5 years, medical terminology

   Foreign Transcripts: Foreign transcripts will be accepted, but **only** when converted through the World Education Services (www.wes.org) degree conversion service. The Degree Conversion Report from WES must state the equivalency of the converted degree to meet the minimum standards listed above for each program. Importantly, irrespective of the resulting degree conversion, all prerequisite coursework for the Cardiovascular Perfusion program must be completed from an accredited college or university in the U.S.

4. Possess the physical and mental qualities required to work in the profession. See section on "Physical, Communication, Mobility, Tactical, Hearing, and Visual Demands".
5. Provide proof of current immunizations and negative TB test

   Immunizations must be current prior to school start.
6. Proof of current health insurance (requirement for clinical affiliates)
7. Provide this list of immunizations to your Primary Care Provider (PCP):
   - 2 Mumps, measles, rubella (MMR) vaccines ***or*** positive titers

- 2 Varicella (Chicken Pox) vaccines ***or*** positive titers (history of Chicken Pox is not acceptable)
- Tetanus, Diphtheria, Pertussis (Tdap) given after age 18 years
- Influenza (Flu) only in flu season
- Tuberculosis (TB) test (TST within last 3 months or QuantiFERON within last 6 months)
- Hepatitis B (Recommended, but not mandatory)

Student Body Limit

To provide a quality educational experience with optimal student-to-teacher ratio, the Cardiovascular Institute has a limited student body per program with a **maximum** number of students as defined below:

Adult Echocardiography – **Ten (10) students**
Cardiovascular Perfusion – **Ten (10) students**
Invasive Cardiovascular Technology – **Twelve (12) students**

All selected candidates are to complete a personal interview with program faculty. The school reserves the right to reject applicants and/or rescind eligibility for an applicant to begin classes if all general and selective admissions requirements are not successfully completed within the required period.

Online Application Process and Timeline (All Programs)

The online application portal is open each year beginning at **12:00am on February 1st** until **11:59pm on April 30th**, at which time the online application portal will automatically close until the next application cycle.

The application process for all programs, including the uploading of all supporting documentation, must be completed online via the application link on the school website. All mandatory fields, required document uploads, and attestations must be completed in order for the applicant to proceed through the online application, and payment must be received as the final step for an application to be considered complete. **Importantly, the email address and contact information provided by the applicant will be used for all correspondence regarding the status of the application.**

No documentation should be physically mailed or emailed to the school or school staff. These documents will neither be retained by the school nor manually applied to an application. Digital documentation will be deleted, and physical documents will be shredded.

Please Note: Partial or incomplete applications will not be processed or retained. Application fees are non-refundable.

All documentation must be submitted in portable document format (pdf) or as specified in the online application portal. (Free pdf scanner applications for iPhone and Android smart phone operating systems are readily available.)

1. **All unofficial college academic transcripts**
   *Please **do not** request or upload official transcripts at this time. Official transcripts and verification of all grades will be required for those applicants selected for an in-person interview.*
2. **Copies of all college degrees earned**
   *It is common for an applicant be actively working on fulfilling the requirements for a degree at the time of applying for a program, and this is perfectly acceptable (e.g. applicant will graduate in May but is applying between February 1st and April 30th). However, copies of all degrees and fulfillment of all admissions requirements must be completed **prior to enrollment into a program at the end of June each year**.*

3. Personal essay
   Essay should reflect why the applicant wants to work in the profession and what qualifications set them apart from other applicants. Maximum of 2 pages, 12-point Calibri or Arial font, double-spaced.
4. Two letters of reference
   One letter should come from a professional (work-related) source and one from a personal source who is not a first-degree relative (e.g. Mother)
5. Current personal resume'
   Education and work histories, patient care experience (if applicable), volunteerism, and pertinent life experiences
6. Cardiovascular Perfusion Program only – Completed *Cardiovascular Perfusion Program Shadowing Form* for each operating room case observed.
   A minimum of 2 observations are required. All completed observations should be uploaded, however, regardless of the hospital location.
7. Application fee payment – $100.00

Complete applications with all required documentation and attestations will be ranked. Once ranked, students will be sent a decision letter regarding their application status as denied or selected for the interview process by May 15th. An Interview Committee selected by each Program Director will interview those students chosen for the interview. The Program Director will make the final decision on acceptance or denial into the program. Acceptance, alternate and denial letters will be emailed by June 15th, and accepted students must claim their seat within 10 calendar days. Two alternates will also be selected and offered a seat in the event that one or more candidates either withdraws their claim to a seat or fails to accept by the deadline. Alternates will be notified as soon as possible that a position has been made available to them. Enrollment for each program will take place on a weekday (to be determined) in the final two weeks of July. Per Texas Workforce Commission rules, all students are required to enroll on-site at the school.

Selective Admissions Criteria

A rubric will be used by the Interview Committee to select applicants for interviews for each program. The personal interview with the interview committee will be implemented as part of the final selection process.

1. Academic performance:

Degree(s) earned (science-based preferred), overall grade point average, individual class grades, and academic accomplishments (Magna Cum Laude, Dean's List, etc)

2. Personal Essay, Letters of Reference, and Resume':

Quality and content of essay and letters of reference; work, volunteer, and life experiences

3. Personal Interview:

Interviewing students only. Overall impression of the applicant from an in-person interview.

Program-Specific Admissions Requirements

Adult Echocardiography Admissions Requirements

It is required for students in the Adult Echocardiography program to take one of the two available national registry credentialing examinations before the end of the summer semester. These tests are offered by Cardiovascular Credentialing International® (CCI®) and the American Registry of Diagnostic Medical Sonographers® (ARDMS®). If you have a criminal background, it can be a barrier to taking the

national registry examinations, which will be a barrier for you to graduate from this program.
Credentialing bodies such as CCI and ARDMS have rules indicating that they may take action against an applicant, candidate, or registrant in the case of conviction, plea of guilty or plea of nolo contendere to any crime.

CCI website: https://cci-online.org/
ARDMS website: https://www.ardms.org/

Cardiovascular Perfusion Admissions Requirements

Applicants to the Cardiovascular Perfusion program are required to have observed two (2) cardiac surgical procedures with a Cardiovascular Perfusionist prior to interviewing for the program.

The application process for the Cardiovascular Perfusion program is open to applicants who meet all of the following minimum criteria at the time of program commencement:

1. Completion of a bachelor's degree from an accredited university or college
2. Cumulative GPA of at least 2.5 on a 4.0 scale
3. Successful completion and submission of application
4. Completion of application essay
5. Pre-requisite coursework: Completion with a grade of "C" or better in all of the following: (Course names may be different at each institution)
    A. Considered Pre-Med Coursework at most Regionally Accredited Colleges/Universities
        i. General Chemistry I; 3 hours
        ii. General Chemistry I, LAB; 1 hour
        iii. General Chemistry II; 3 hours
        iv. General Chemistry II, LAB; 1 hour
        v. General Biology I; 3 hours
        vi. General Biology I, LAB; 1 hour
        vii. General Biology II; 3 hours
        viii. General Biology II, LAB; 1 hour
        ix. General Physics I; 3 hours
        x. General Physics I, LAB; 1 hour
    B. Mathematics:
        i. College Algebra or higher; 3 hours
        ii. Statistics; 3 hours
    C. Applied Science: (3 hours in ONE of the following classes)
        i. Biochemistry; 3 hours
        ii. Organic chemistry; 3 hours
        iii. Cell Physiology; 3 hours
        iv. Cell Biology; 3 hours
    D. Human Anatomy and Physiology; 6 hours

Invasive Cardiovascular Technology Admissions Requirements

It is required for students in the Invasive Cardiovascular Technology program to take the national registry credentialing examination before the end of the summer semester. Testing is offered by CCI. If you have a criminal background, it may be a barrier to taking the national registry examination, which will be a barrier for you to graduate from this program. Credentialing bodies such as CCI has rules indicating that they may act against an applicant, candidate, or registrant in the case of conviction, a plea of guilty or nolo contendere to any crime.
CCI website: https://cci-online.org/

Admissions Procedure (All Programs)

- Applications that are complete and received by the **June 1st deadline** are reviewed by the admissions committee, rated, and the applicant is notified of his/her eligibility for an interview and tour of the school and facilities.
- Prerequisite coursework must be completed before the start of the program.
- Interviews will take place at the Cardiovascular Institute, 1100 Allied Drive, Ste. 5-504, Plano, TX 75093. Interviews by the admissions committee run approximately 30-45 minutes in length.
- All applicants will be notified via email whether or not they have been **accepted** into the program, designated as an **alternate** or **denied** entry into a program by **July 15th**.
- If accepted, the applicant is required to confirm or decline acceptance via email by **July 31st**. Accepted applicants not wishing to attend should notify the school immediately so that an alternate applicant may be selected and notified.
- Applicants will be enrolled on-campus and all enrollment paperwork signed on site by both the student and an authorized school official. Copies of all signed paperwork will then be given to the student and a copy kept on file at the school for each student.

Admissions documents include all of the following:

1. Electronic Program Application Form with supporting documentation
2. School Tour Acknowledgement Form
3. Program Acceptance Letter
4. Record of Previous Education and Training (TWC-CSC Form CSC-010)
5. Student Enrollment Agreement Form
6. Receipt of Enrollment Policies Form

Baylor Scott & White Health Mission Statement

The Cardiovascular Institute operates as part of a sustainable, integrated health care delivery system of BSWH and other affiliated hospitals and health care providers. As an affiliate of BSWH, BSW The Heart Hospital-Plano is required to adhere to high standards for medical quality, patient safety and patient satisfaction. These standards help achieve consistency and are set forth by the System. BSW The Heart Hospital-Plano, along with other BSWH affiliates, provides community benefit activities reflective of the System mission: "*Founded as a Christian ministry of healing, BSW Health exists to serve all people through exemplary health care, education, research, and community service*."

The Cardiovascular Institute Goals and Objectives

The specific goals of the Cardiovascular Institute are to promote the well-being of all individuals, families, and communities in the North Texas region through the education of Allied Health professionals with focus on evidence-based practices and excellent patient care. As a student at the Cardiovascular Institute, we have prepared this Student Catalog so that you may know your rights, privileges, duties, and our expectations of you. It is important that you clearly understand the program's policies and general hospital regulations. The student will be expected to abide by all policies and procedures stated in this Student Catalog. We urge you to read through the information carefully and refer to it continuously throughout your tenure as a student in your respective program.

The goals and objectives for **all** Cardiovascular Institute programs are "*To prepare competent entry-level cardiovascular technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains for every Allied Health program.*" At the conclusion of each program, the

student should have developed the minimum competencies to sit for national registry exams in their respective field of study. In addition, the student should have learned to work and communicate effectively with other Allied Health care professionals, patients and their families to promote patient safety, diagnosis and recovery.

Professionalism

As an institution of healthcare education, it is important that the school prepares each student to be successful in the work environment, both personally and professionally. Treating, imaging and interacting with patients with a wide variety of medical conditions places the Allied Health professional in a very trusted position. Our patients trust us to perform at our best *each and every time* and we should strive to deliver the best healthcare possible. *You will have the ability to impact or change the course of a patient's treatment altogether, and that should never be taken lightly.* Along with sensitive medical information, you will also be trusted with much personal information about every patient which must be held in the strictest confidence and respect. The school expects *all* students to behave in a professional, appropriate and ethical manner at all times. Reports of professional misconduct, especially in the patient setting, will be taken very seriously. Consequences, if any, will be determined by the school administration and could result in expulsion from the program.

English Proficiency

The Cardiovascular Institute does not provide English as a second language instruction. Students are required to speak English in classes that are taught in English. A student whose native language is not English and is enrolling in programs taught in English is required to provide proof of English proficiency by one of the following:

- Test of English as a Foreign Language (TOEFL) with an Internet-Based Test (iBT) score of 61 or higher, Paper-Based Test score of 500 or higher, or Computer-Based Test (CBT) score of 173;
- Advanced Placement International English Language (APIEL) with a score of 173 or higher;
- International English Language Testing System (IELTS) with a level of 6 or higher;
- Successful completion (i.e. grade of PASS or 'C' or Better) of accredited high school or accredited college coursework taught in English; or,
- Completion of an interview with the Program Director or his/her designee.

Re-Entering and Withdrawal

Students who have previously attended the Cardiovascular Institute but did not graduate or voluntarily withdrew from the program, will not be allowed to re-enter the program during the academic school year. The academic school year is defined as the first day of class through the last day of class. The student may re-apply to the program as a new applicant the following year. There is no guarantee the student will be accepted into the program.

Termination Policy

A student will be terminated for noncompliance with school policies published in the Student Catalog. This includes, but is not limited to conduct, nonpayment, insufficient academic progress, attendance, and failure to comply with school rules and regulations. The policies outlined in the Student Catalog explain the school's expectation of the student and disciplinary action for noncompliance.

Pregnancy Policy

Any student who becomes pregnant during the academic school year should notify the Program Director immediately. The student will be allowed to complete the program. If the student elects to withdraw from the program due to the pregnancy, arrangements will be made to hold a position for her in a future class.

Cancellation Policy

Per Texas State Law, a full refund will be made to any student who cancels the enrollment agreement within 72 hours (until midnight of the third day excluding Saturdays, Sundays, and legal holidays) after the enrollment agreement is signed. A full refund will also be made to any student who cancels enrollment within the student's first three scheduled class days, except that the school may retain not more than $100 in any administrative fees charged, as well as items of extra expense that are necessary for the portion of the program attended and stated separately on the enrollment agreement.

Refund Policy

Per Texas State Law and per the TWC-CSC, the refund policy is as follows:

1. Refund computations will be based on scheduled course time of classes through the last documented day of an academically related activity. Leaves of absence, suspensions and school holidays will not be counted as part of the scheduled class attendance.
2. The effective date of termination for refund purposes will be the earliest of the following:
    a) the date of termination, if the student is terminated by the school;
    b) the date of receipt of written notice from the student; or
    c) ten school days following the last date of attendance.
3. If tuition and fees are collected in advance of entrance, and if after expiration of the 72 hour cancellation privilege the student does not enter school, not more than $100 in any administrative fees charged shall be retained by the school for the entire program.
4. If a student enters a program and withdraws or is otherwise terminated, the school may retain not more than $100 in administrative fees charged for the entire program. The minimum refund of the remaining tuition and fees will be the pro rata portion of tuition, fees, and other charges that the number of hours remaining in the portion of the course or program for which the student has been charged after the effective date of termination bears to the total number of hours in the portion of the course or program for which the student has been charged, except that a student may not collect a refund if the student has completed 75 percent or more of the total number of hours in the portion of the program for which the student has been charged on the effective date of termination. (More simply, the refund is based on the precise number of course time hours the student has paid for, but not yet used, at the point of termination, up to the 75% completion mark, after which no refund is due.)
5. Refunds for items of extra expense to the student, such as books, tools, or other supplies are to be handled separately from refund of tuition and other academic fees. The student will not be required to purchase instructional supplies, books and tools until such time as these materials are required. Once these materials are purchased, no refund will be made. For full refunds, the school can withhold costs for these types of items from the refund as long as they were necessary for the portion of the program attended and separately stated in the enrollment agreement. Any such items not required for the portion of the program attended must be included in the refund.
6. A student who withdraws for a reason unrelated to the student's academic status after the 75 percent completion mark and requests a grade at the time of withdrawal shall be given a grade of "incomplete" and permitted to re-enroll in the course or program during the 12-month period following the date the student withdrew without payment of additional tuition for that portion of the course or program.
7. A full refund of all tuition and fees is due and refundable in each of the following cases:
    a) an enrollee is not accepted by the school;
    b) if the course of instruction is discontinued by the school and this prevents the student from completing the course; or

c) if the student's enrollment was procured as a result of any misrepresentation in advertising, promotional materials of the school, or representations by the owner or representatives of the school.

A full or partial refund may also be due in other circumstances of program deficiencies or violations of requirements for career schools and colleges.

Refund Policy for Students Called to Active Military Service

1. A student at the school who withdraws from the school as a result of the student being called to active duty in a military service of the United States or the Texas National Guard may elect one of the following options for each program in which the student is enrolled:
    a) if tuition and fees are collected in advance of the withdrawal, a pro rata refund of any tuition, fees, or other charges paid by the student for the program and a cancellation of any unpaid tuition, fees, or other charges owed by the student for the portion of the program the student does not complete following withdrawal.
    b) a grade of incomplete with the designation "withdrawn-military" for the courses in the program, other than courses for which the student has previously received a grade on the student's transcript, and the right to re-enroll in the program, or a substantially equivalent program if that program is no longer available, not later than the first anniversary of the date the student is discharged from active military duty without payment of additional tuition, fees, or other charges for the program other than any previously unpaid balance of the original tuition, fees, and charges for books for the program; or
    c) the assignment of an appropriate final grade or credit for the courses in the program, but only if the instructor or instructors of the program determine that the student has:
        1. satisfactorily completed at least 90 percent of the required coursework for the program; and
        2. demonstrated sufficient mastery of the program material to receive credit for completing the program.

The payment of refunds will be totally completed such that the refund instrument has been negotiated or credited into the proper account(s) within 60 days after the effective date of termination.

CVI Programs and Course Descriptions

Satisfactory Progress (All Programs)

Students must maintain a grade of **77% or better in each course, lab and clinical internship** for their progress to be considered satisfactory. Progress reports of each student's current grades and academic performance will be generated at least once per semester after mid-term testing for the entirety of the program. Private student conferences will then be conducted by the Program Director or primary Instructor of the program. Corrective actions for improved or continuing academic or professional success will be advised, and this feedback documented and placed in the student's permanent school records. Students will have an opportunity to enter their comments on the record, as well.

Grading Scale and Marking System (All Programs)

All CVI students may view their current grades at any time during a course through the Canvas app or website. Course grades may be based on attendance, Canvas quizzes and exams, laboratory work, clinical assignments, case presentations and projects as indicated on each course syllabi.

Grading Scale:
A 100-92%
B 91-84
C 83-77%
D 76-64%
F < 64%

*Minimum passing grade is 77% for all classes, which is a C. ***Grades are rounded up from ≥0.50***.

Contact Hours (All Programs)

All lectures, laboratory or clinical internship periods 50-60 minutes in length constitute one academic contact hour. For each hour of lecture, students are expected to spend a minimum of two hours outside of class preparing for the course.

Adult Echocardiography

Program Description

The Cardiovascular Institute Adult Echocardiography program is a ***certificate-level***, 51-week program divided into three semesters approximately 16 weeks in length – Fall, Spring and Summer. The program consists of didactic classroom, hands-on laboratory and clinical internship experience with coursework designed to build upon previous courses. Students will learn to become competent entry-level cardiovascular technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains and will be qualified to sit for national credentialing examinations. Graduates may work in a variety of allied healthcare settings, from large hospital centers to small outpatient clinics, performing diagnostic ultrasound examinations on the adult heart.

Programmatic Accreditation Status

The Adult Echocardiography program is **programmatically accredited** by the Commission on Accreditation of Allied Health Education Programs (CAAHEP), upon the recommendation of the Joint Review Committee on Education in Cardiovascular Technology (JRC-CVT).

Contact Information:
Commission on Accreditation of Allied Health Education Programs
9355 - 113th St. N, #7709
Seminole, FL 33775
P: 727.210.2350
F: 727.210.2354
E: mail@caahep.org

Instructor Contact Information

Name: Brad J. Roberts, BS, ACS, FASE
Phone: 469.814.3600
Fax: 469.814.3609
Email: Brad.Roberts@BSWHealth.org
Office Location: Suite 5-504
Office Hours: Mon – Thurs 8:00am – 3:30pm

Name: Julie Britain, BS, RCS, RDCS
Phone: 469.814.3600
Fax: 469.814.3609
Email: Julie.Britain@BSWHealth.org
Office Location: Suite 5-504
Office Hours: Tues 8:00am – 3:30pm and by appointment

Required Textbooks and Course Materials:

- Anderson, B. *A Sonographer's Guide to the Assessment of Heart Disease*. 2017. Echotext Pty Ltd. ISBN-13: 978-0992322205
- Anderson, B. *Echocardiography: The Normal Examination and Echocardiographic Measurements, 3rd Edition*. 2018. Echotext Pty Ltd. ISBN-13: 978-0992322212
- Kremkau, F. *Sonography Principles and Instruments, 10th Edition*. 2021. Elsevier Inc. ISBN-13: 978-0323597081
- ASE Guidelines and Standards @ www.asecho.org
- Supplemental materials available online through Baylor Health Sciences Library

Program Outline

Subject Number	Fall Semester I Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
AE-101	Adult Echocardiography I	70 / 0 / 0 / 70
AE-105	Ultrasound Physics and Instrumentation I	15 / 0 / 0 / 15
AE-101L	Adult Echocardiography I Lab	0 / 171 / 0 / 171
AE-107C	Adult Echocardiography Internship I	0 / 0 / 119 / 119

Subject Number	Spring Semester II Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
AE-201	Adult Echocardiography II	48 / 0 / 0 / 48
AE-205	Ultrasound Physics and Instrumentation II	32 / 0 / 0 / 32
AE-201L	Adult Echocardiography II Lab	0 / 96 / 0 / 96
AE-207C	Adult Echocardiography Internship II	0 / 0 / 408 / 408

Subject Number	Summer Semester III Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
AE-301	Adult Echocardiography III	45 / 0 / 0 / 45
AE-305	Ultrasound Physics & Registry Review	30 / 0 / 0 / 30
AE-307C	Adult Echocardiography Internship III	0 / 0 / 485 / 485
	Total Contact Hours	**240 / 267 / 1,012 / 1,519**

Description of Subjects by Semester

Fall – Semester I

Adult Echocardiography I (AE-101)

This course will cover basic cardiovascular anatomy and hemodynamic principles of the cardiovascular system. Students will learn the cardiac cycle with a focus on event timing, basic cardiovascular pharmacology, and electrocardiograms (EKG). Also included in this course is an introduction to the ultrasound appearance of basic cardiac anatomy as well as an introduction to cardiac abnormalities seen in echocardiography.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Describe the principles of cardiovascular anatomy and physiology
- Describe the systemic and pulmonary circuits of the circulatory system
- List the normal embryologic formation of the heart
- List common congenital malformations of the heart
- Describe the layers of the arterial and venous walls
- Describe ventricular wall segments, coronary circulation and LV function
- List methods for the assessment of LV systolic/diastolic function
- Demonstrate hemodynamics of the heart at rest and with exercise
- Describe the basic waveforms of the EKG
- List the normal conduction of the heart
- List the normal anatomy of the heart including chambers, septa, valves, entering and exiting vessels, and the pericardial sac
- List the normal anatomy of the heart as seen by echocardiography
- Describe the normal pressures in each chamber of the heart as well as the great vessels
- List the normal blood oxygen concentration in each chamber of the heart as well as great vessels
- Describe the normal cardiac events
- Describe basic heart rhythms and arrhythmias
- Demonstrate the echocardiographic techniques in basic imaging
- List the echocardiographic methods used to assess heart pressures
- Describe echocardiographic assessment of pulmonary pressures and pulmonary vascular disease
- Describe basic pharmacology and use of medicines in stress testing

Course Requirements:
Students must earn the minimum grade of 77% to progress to the next semester and continue the program.

Prerequisite: Admission to the program

Contact Hours: 70

Ultrasound Physics and Instrumentation I (AE-105)

Students will apply the principles of sound, sound propagation, pulse echo instrumentation, image formation, transducers, and system operation for accurate interpretation of sonographic information and image methodology. The integration of these theories and abstract principles with their practice clinical applications will be emphasized.

Course Objectives:
Given the theoretical content, at the completion of this course, students will be able to:

- Demonstrate an understanding of ultrasound physical principles.
- Determine the relationships between variables found in mathematical equations that pertain to ultrasound listed in the topics for this course.
- Calculate propagation of speed, frequency, period, and roundtrip time.
- Identify functional components of a pulse-echo ultrasound imaging system.
- Apply concepts of ultrasound physics to energy transmission and image resolution.
- Describe the physical causes of ultrasound imaging artifacts.
- Define sound and ultrasound; visualize formation and travel of sound waves.
- Define the physical parameters that describe sound and how these interrelate to each other.
- Define intensity and decibel.
- Define attenuation and list the processes involved.

- Describe refraction, reflection, diffraction, and the laws governing them.
- Describe the piezoelectric effect.
- Classify various ultrasound transducers by design and function.
- Describe the various means by which we can focus an ultrasound beam.
- Identify the regions of a sound beam and the parameters affecting them.
- Identify and describe the different hardware parts of an ultrasound system.
- Identify and describe the different software applications in an ultrasound system.
- Demonstrate measurements of anatomical structures by use of electronic calipers.
- Explain what is known about ultrasound bioeffects in cells, animals, and humans.
- Describe what is known regarding the risk with the use of sonography.
- List the necessary steps to avoid unreasonable exposure to ultrasound.

Course Requirements:

Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program

Contact Hours: 15

Adult Echocardiography I Lab (AE-101L)

This course complements the didactic instruction of AE-101 and includes a number of hands-on and learning activities as well as observational and interactive learning as scheduled by the program director. Students simulate the clinical echocardiography laboratory by scanning each other and other volunteers and obtaining targeted ultrasound images of the heart. The student becomes familiar with imaging equipment controls, transducer positions relative to anatomy, and scanning techniques. Under supervision, students will apply didactic information to practical lab techniques in echocardiography. The sonographic appearance of cardiac anatomy and function will be emphasized, along with hemodynamics. Other activities will include interaction with cardiovascular teaching tools such as plastic heart models, scanning phantoms and preserved human tissue specimens. Some of the labs will involve echocardiography image review with an experienced reader with ongoing question and answer interactive learning. Adult Echocardiography I Lab is structured to increase complexity and difficulty as the student progresses through the program.

Course Objectives:

As a result of the successful completion of the course, students will be able to:

- List the different imaging modalities used in echocardiography
- Describe how ultrasound physics is related to the creation of the ultrasound image
- Demonstrate the use of psychomotor skills when acquiring two-dimensional (2D) imaging in the creation of the echocardiography image
- List the imaging planes used in echocardiography
- Describe how to optimize 2D imaging for improved visualization of heart structures
- Demonstrate the role of cultural diversity in the communication process during the exam
- List the different controls used to create the ultrasound image
- Demonstrate how to prepare the exam room, ultrasound equipment, and the patient for the exam
- Demonstrate proper body mechanics and ergonomics during the exam
- List the pertinent clinical information that is obtained prior to performing the echocardiogram
- Demonstrate the use of M-mode for the assessment of heart structure
- Demonstrate a systematic approach to the 2D exam

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program
Co-requisite: AE-101

Contact Hours: 171

Adult Echocardiography Internship I (AE-107C)

This is the first of three consecutive clinical sonography courses which function to prepare the student at a basic level in the cognitive (knowledge), psychomotor (skills) and affective (behavior) learning domains for adult echocardiography. The student will rotate among two or more clinical sites to provide a more diverse introduction to the clinical setting. The final goal from the sequence of all three clinical courses is for the student to achieve an entry-level competency for a cardiac sonographer.

Course Objectives:
Upon successful completion of this course the student will be able to:

- Apply basic and fundamental skills learned in AE-101L to limited scanning in the clinical setting
- Describe the fundamental components and operation of an echocardiography lab, including the ultrasound equipment, personnel roles, computer programs and patient scheduling.
- Describe cardiac sonography lab dynamics and its relationship to the rest of the hospital or institution
- Exhibit professional behavior with patients and healthcare staff
- Demonstrate the role of cardiac ultrasound in patient care and management

Course Requirements:
Grading is based on PASS/FAIL and students must earn the minimum grade of PASS in this course to progress to the next semester and continue the program.

Prerequisites: Admission to the program
Co-requisites: AE-101 Adult Echocardiography I, AE-101L Adult Echocardiography I Lab

Contact Hours: 119

Spring – Semester II

Adult Echocardiography II (AE-201)

This course is an extension of AE-101 Adult Echocardiography I, covering in depth pathophysiology of heart disease and the role of ultrasound diagnosis. Topics include measurements of hearts size, calculations of valve area, hemodynamics, estimation of regurgitation, evaluation of native valve disease, evaluation of pericardial disease, prosthetic valves, aortic disease, cardiomyopathies, evaluation of cardiac tumors, and hypertensive heart disease.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Describe the pathology and pathophysiology of cardiac disease of the myocardium and valves and how to assess them with echocardiography
- Describe diastolic assessment of the left ventricle using echocardiography, normal values and values suggestive of elevated filling pressures
- Describe the calculations for valve area for stenosis
- List the severity of valvular regurgitation
- Analyze various cases associated with valvular disease and stenosis
- Demonstrate how to assess the pericardium and pericardial disease

- Describe echo assessment of heart valve repair, replacement and transcatheter therapies
- Describe prosthetic heart valve replacement types and how to assess them using echocardiography
- Describe ultrasound findings associated with ischemic heart disease
- Demonstrate how to differentiate the type of cardiac masses
- Describe pathophysiologic complications of coronary artery disease
- Describe the echocardiographic findings in the disease of the aorta
- Demonstrate how to assess and interpret LV and RV systolic function
- Describe common congenital heart disease and how to assess them using echocardiography
- List cardiac pathologies associated with trauma
- Describe echocardiographic assessment of intracardiac shunts using Doppler, agitated saline microbubbles and ultrasound enhancing agents
- Identify appropriate indications, limitations, and appropriate uses for transthoracic echocardiography
- Identify appropriate indication, contraindications, administration and uses for ultrasound enhancing agents (transpulmonary contrast)
- Communicate one's roles and responsibilities as a sonographer clearly to patients, families, community members, and other professionals.
- Communicate information with patients, families, community members, and health team members in a form that is understandable, avoiding discipline-specific terminology when possible.
- Collaborate and educate other health care providers in the appropriate applications of diagnostic ultrasound and vascular applications.

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: AE-101 Adult Echocardiography I

Co-requisite: AE-201L Adult Echocardiography Lab II

Contact Hours: 48

Ultrasound Physics and Instrumentation II (AE-205)

This course continues exploring the theoretical and abstract principles that form the technological basis of diagnostic medical sonography. Topics will include, Doppler physics and instrumentation, artifacts, quality assurance, and hemodynamics. Physics applications and principles will be highly emphasized.

Course Objectives:
At the completion of this course, students will be able to:

- Explain how the primary components of a sonographic system work. Demonstrate the effect of coded excitation, gain, compensation, detection, and compression. Describe how images are stored electronically and compare signal processing and image processing. Analyze preprocessing and post processing in sonography. Differentiate between: CRT, Plasma, LCD and LED displays
- Analyze and describe axial, lateral, temporal, elevational, spatial, and contrast resolutions pertaining to the diagnostic quality of the ultrasound image.
- Differentiate between Doppler Effect, Doppler shift, and Doppler angle and calculate the Doppler shift using different speed and frequencies. Analyze and differentiate the different types of Doppler applications: Color, Power, and Spectral. Define Hue, saturation, luminance. Explain the effect of each of them on Doppler images.

- Differentiate and interpret the types of hemodynamic flow and explain the influence of pressure and resistance on blood flow in the body.
- Differentiate and classify the 2 dimensional and Doppler artifacts and how to correct them.
- Analyze the effect of stenosis on blood circulation and predict flow characteristics, before and after the stenosis.
- Differentiate between Exam object and Exam phantoms and explain how they are used for Examining various performance characteristics of instruments
- Analyze the effect of excessive output power and explain relevant concepts about ultrasound bioeffects in cells, animals, and humans.
- Analyze and implement the ALARA principle. ALARA= As Low As Reasonable Achievable and list the necessary steps to avoid unreasonable exposure to ultrasound.
- Apply the concepts of ultrasound physics in the production of diagnostic sonographic images.

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Course Prerequisite: AE-105 Ultrasound Physics and Instrumentation I

Contact Hours: 32

Adult Echocardiography II Lab (AE-201L)

This course complements the didactic instruction of AE-201 and includes a number of hands-on and learning activities as well as observational and interactive learning as scheduled by the program director. Students simulate the clinical echocardiography laboratory by scanning each other and other volunteers and obtaining targeted ultrasound images of the heart. The student becomes proficient with imaging equipment controls, transducer positions relative to anatomy, and scanning techniques. Under supervision, students will apply didactic information to practical lab techniques in echocardiography. The sonographic appearance of cardiac anatomy, pathology and function will be emphasized, along with hemodynamics. Other activities will include interaction with cardiovascular teaching tools such as plastic heart models, scanning phantoms and preserved human tissue specimens. Some of the labs will involve echocardiography image review with an experienced reader with ongoing question and answer interactive learning. Adult Echocardiography II Lab is structured to increase complexity and difficulty as the student progresses through the program.

Course Objectives:
Upon successful completion of this course, the student will be able to:

- List the different imaging techniques required for the optimization of the echocardiographic image
- Describe how the Doppler principles are applied to the ultrasound image
- Demonstrate the use of psychomotor skills when acquiring two-dimensional (2D) and Doppler techniques for the creation of the echocardiography image
- List the imaging protocol for the complete echocardiographic examination
- Describe how to optimize 2D imaging for improved visualization of heart structures
- Demonstrate how to apply color Doppler for the assessment of valvular regurgitation
- List the different measurements needed to assess valvular disease
- Demonstrate how to measure heart size and function
- Demonstrate proper body mechanics and ergonomics during the exam
- List the pertinent clinical information that is obtained prior to performing the echocardiogram
- Demonstrate the use of M-mode for the assessment of heart structure
- Demonstrate a systematic approach to the 2D and Doppler exam

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: AE-101 Adult Echocardiography I Lab

Co-requisite: AE-201 Adult Echocardiography II

Contact Hours: 96

Adult Echocardiography Internship II (AE-207C)

This is the second of three consecutive clinical sonography courses providing an internship of supervised clinical practicum hours which prepares the student in the cognitive (knowledge), psychomotor (skills) and affective (behavior) learning domains for adult echocardiography. Students must demonstrate increasing proficiency of the required echocardiography modalities that will allow them to achieve clinical competency levels before graduation. The final goal from both clinical courses is to achieve a competency level of an entry-level cardiac sonographer upon completion of the clinical course sequence.

Course Objectives:
Upon successful completion of this course the student will be able to:

- Apply skills learned in AE-101L and AE-201L
- Apply their knowledge, improve their scanning skills and achieve the required proficiency level on routinely performed echocardiograms of the clinical site, using site-specific protocols
- Possess understanding and awareness of cardiac sonography lab dynamics and its relationship to the rest of the hospital or institution
- To interact on a professional level with patients and healthcare staff
- Demonstrate the role of cardiac ultrasound in patient management

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisites: AE-107C Clinical Internship I
Co-requisite: AE-201 Adult Echocardiography II, AE-201L Adult Echocardiography II Lab

Contact Hours: 408

Summer – Semester III

Adult Echocardiography III (AE-301)

This course is a continuation of topics covered in AE-201 Adult Echocardiography II and designed to build upon that subject matter. Clinical signs & symptoms of complex cardiovascular pathophysiology and associated ultrasound findings will be discussed. Sonographers' role in emergent echocardiography, sonographic findings associated with chemotherapy use, as well as stress echocardiography will also be covered.

Course Objectives:
Upon successful completion of this course, the student will be able to:

- List the types of cardiomyopathies and assessment using echocardiography
- Explain the use of contrast imaging
- Recognize different types of cardiac masses by echocardiography
- List the measurements of the aorta
- Analyze myocardial measurements of speckle tracking strain imaging
- Demonstrate how to assess a pericardial effusion and tamponade physiology
- Demonstrate how to assess the aorta

- Categorize the different types of aortic dissection
- Recognize echocardiographic findings from cardiac trauma such as blunt force impact, penetrating trauma
- Solve for advanced calculations for the assessment of valvular regurgitation
- Describe ultrasound findings associated with a variety of cardiomyopathies
- Describe how 3D imaging is used in clinical practice
- Demonstrate how to interpret 3D imaging
- Describe ultrasound findings associated with complications from ischemic heart disease
- Describe the echocardiographic findings in the disease of the aorta
- Demonstrate how stress testing is used with echocardiography
- Demonstrate a stepwise approach to various diseases by echocardiography
- Describe various cardiac assist devices and their role in helping patients
- Describe cardiac transplantation and assessment with echocardiography
- List systemic diseases that affect the cardiovascular system
- Describe transesophageal echocardiography including strengths, weaknesses, identification of normal and abnormal findings, and uses in the operating room
- Describe transcatheter therapies for intervention on the heart and the role of echocardiography
- Communicate one's roles and responsibilities as a sonographer clearly to patients, families, community members, and other professionals.
- Communicate information with patients, families, community members, and health team members in a form that is clear, avoiding discipline-specific terminology when possible.
- Collaborate and educate other health care providers in the appropriate applications of diagnostic ultrasound and vascular applications.

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: AE-201 Adult Echocardiography II

Contact Hours: 45

Ultrasound Physics & Registry Review (AE-305)

This course is cumulative preparation for national credentialing board examinations. It involves real-world applications of physics, artifact recognition and rectification, and instrumentation of the ultrasound machine. Students will participate in interactive mock examinations in preparation for the credentialing examination. Activities may include reviewing complex echocardiography cases which require critical thinking skills, presenting a case study that they choose, and reviewing human pathology specimens.

Course Objectives:
Upon successful completion of this course the student should be able to:

- Demonstrate an understanding of ultrasound physical principles and answer questions about the physical parameters involved in ultrasound and how they may be affected.
- Use the appropriate formula to calculate the different ultrasound parameters and determine the relationships between variables found in mathematical equations that pertain to ultrasound listed in the topics for this course.
- Analyze Q and A related to describe functional components of a pulse-echo ultrasound imaging system.
- Apply concepts of ultrasound physics to energy transmission and image resolution.
- Analyze Q and A related to the physical causes of ultrasound imaging artifacts and bioeffects.

- Analyze Q and A related to differentiate the parameters in continuous wave Vs pulse wave.
- Analyze Q and A related to differentiate characteristics of the various ultrasound transducers by design, function, and applications.
- Analyze Q and A related to the regions of a sound beam and the parameters affecting them.
- Analyze Q and A related to the different hardware parts of an ultrasound system.
- Analyze Q and A related to all types of Doppler
- Analyze the ALARA principle. ALARA = As Low As Reasonably Achievable.

Prerequisite: AE-205 Ultrasound Physics and Instrumentation II

Contact Hours: 30

Adult Echocardiography Internship III (AE-307C)

This is the last of two consecutive clinical sonography courses providing an internship of supervised clinical practicum hours in which the student acquires the knowledge and skills relevant to adult echocardiography. Students must demonstrate increasing proficiency of the required echocardiography modalities that will allow them to achieve clinical competency levels before graduation. The final goal is to achieve a competency level of an entry-level cardiac sonographer upon completion of the clinical course sequence.

Course Objectives:
Upon successful completion of this course, the student should be able to:

- Demonstrate competent entry-level echocardiographer skills
- Apply their didactic and clinical knowledge, improve their scanning skills, and achieve the required proficiency level on routinely performed echocardiograms following the protocols of the clinical site.
- Interact on a professional level with healthcare staff and patients (and parents/guardians of patients in the pediatric setting).
- Demonstrate effective critical thinking, cognitive, and psychomotor skills as described on the evaluation forms in Trajecsys and on Blackboard
- Demonstrate patient care skills as required in the cardiovascular lab.
- Demonstrate the role of cardiac ultrasound in patient management.

Prerequisite: AE-207C Clinical Internship II
Co-requisite: AE-301 Adult Echocardiography III

Contact Hours: 485

Length of Program: 51 weeks; Total Contact Hours: 1,519

Cardiovascular Perfusion

Program Description

The Cardiovascular Institute Cardiovascular Perfusion program is a ***certificate-level***, 51-week program which is divided into three semesters approximately 16 weeks in length – Fall, Spring and Summer. The program consists of didactic classroom, hands-on laboratory and clinical internship experience with coursework designed to build upon previous courses. Students will learn to become competent entry-level cardiovascular perfusionists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains and will be qualified to sit for national credentialing examinations. Graduates may gain employment in a variety of allied healthcare settings, from large hospital centers to smaller surgical units, working as a cardiovascular perfusionist.

Programmatic Accreditation Status

The Cardiovascular Perfusion program is **programmatically accredited** by the Commission on Accreditation of Allied Health Education Programs (CAAHEP), upon the recommendation of the Accreditation Committee – Perfusion Education (AC-PE).

The Profession of Cardiovascular Perfusion

Perfusionists may be employed in hospitals, by surgeons, and as employees of a group practice. They typically work during the week and are frequently on call for emergency procedures on weekends and nights. They also may work in an on-call system, depending on the number of perfusionists employed by their organization. A perfusionist operates extracorporeal circulation and autotransfusion equipment during any medical situation where it is necessary to support or temporarily replace the patient's circulatory or respiratory function. The perfusionist is knowledgeable concerning the variety of equipment available to perform extracorporeal circulation functions and is responsible, in consultation with the physician, for selecting the appropriate equipment and techniques to be used.

Perfusionists conduct extracorporeal circulation and ensure the safe management of physiologic functions by monitoring the necessary variables. This can be in the form of cardiopulmonary bypass as well as extracorporeal membrane oxygenation. The perfusionist provides consultation to the physician in the selection of the appropriate equipment and techniques to be used during extracorporeal circulation. During cardiopulmonary bypass, the perfusionist may administer blood products, anesthetic agents, or drugs through the extracorporeal circuit on prescription and/or appropriate protocol. The perfusionist is responsible for the monitoring of blood gases and the adequate anticoagulation of the patient, induction of hypothermia, hemodilution, and other duties, when prescribed. On the business side of things, a Perfusionist may be administratively responsible for purchasing supplies and equipment, as well as for personnel and departmental management. Final medical responsibility for extracorporeal perfusion rests with the surgeon in charge.

Program Goals and Objectives

The goals and objectives of the Cardiovascular Perfusion program are specifically to:

1. Educate students in Perfusion Technology though an interactive and engaging 12-month course of study proctored by physicians, perfusionists, and healthcare professionals who are passionate about educating future generations of perfusionists.
2. Provide students with a dual sided approach to a Perfusion Technology Education, with focus on didactic study as well as a clinical apprenticeship simultaneously.
3. Prepare competent entry-level perfusionists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains in the underserved areas of North Texas.
4. Provide an exceptional Perfusion Technology Education at an affordable price to all students, regardless of financial circumstance.

Instructor Contact Information

Name: Altaf (Al) Panjwani MS, MBA, CCP, LCP
Phone: 770-312-7392
Email: Altaf.Panjwani@BSWHealth.org
Office Location: Suite 5-504
Office Hours: Tuesday and Thursday, 11:00am – 1:00pm and by appointment

Required Textbooks and Course Materials:

- Englert, J., *The Manual of Clinical Perfusion, 3rd Edition.* 2023. Perfusion.com. ISBN-13: 979-8822918573
- Dubin, D., *Rapid Interpretation of EKGs, 6th Edition*. 2004. COVER Publishing Company.

ISBN-13: 978-0912912066

- Gravlee, G., Davis, R., *Cardiopulmonary Bypass and Mechanical Support: Principles and Practice*. 2016. Wolters Kluwer.
  ISBN-13: 978-1451193619
- Supplemental materials available online through Baylor Health Sciences Library

Recommended Readings:

These books are available in the Perfusion Program Library:

1. Blood: Self Teaching Hematology, Immunology, and Transfusion Therapy by John F. Dailey; 2nd ed.
2. A Practical Approach to Cardiac Anesthesia by Frederick A. Hansley, Jr., Donal E. Martin
3. Cardiopulmonary Bypass by Ghosh, Flater, and Cook (Cambridge University Press)
4. Comprehensive Intra-Aortic Balloon Counter-Pulsation by Susan J. Quaal
5. Braunwald's Heart Disease A textbook of Cardiovascular Medicine Volume 1 by Mann, Zipes, Libby, Bonow
6. Braunwald's Heart Disease a Textbook of Cardiovascular Medicine Volume 2 by Mann, Zipes, Libby Bonow
7. Cardiovascular Physiology by Berne, Levy
8. Pathophysiology of Heart Disease by Lilly
9. Techniques in Bedside Hemodynamic Monitoring by Daily, Schroeder
10. A Practical Approach to Cardiac Anesthesia by Hensley, Martic, Gravlee
11. Arterial Blood Gas Analysis Made Easy by Anup
12. Illustrated Field Guide to Congenital Heart Disease and Repair by Everett, Lim
13. *Pharmacology & Physiology in Anesthetic Practices, Fourth Edition* Stoelting and Hillier

Program Outline

Subject Number	Fall Semester I Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
CVP-101	Cardiovascular Anatomy & Physiology I	45 / 0 / 0 / 45
CVP-102	Pathology, Pathophysiology & Surgical Repair	45 / 0 / 0 / 45
CVP-103	Perfusion Technology I	45 / 0 / 0 / 45
CVP-104	Laboratory Analysis	15 / 0 / 0 / 15
CVP-105	Medical Monitoring	15 / 0 / 0 / 15
CVP-110	Clinical Practicum/Internship I	0 / 0 / 357 / 357

Subject Number	Spring Semester II Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
CVP-201	Cardiovascular Anatomy & Physiology II	45 / 0 / 0 / 45
CVP-203	Perfusion Technology II	45 / 0 / 0 / 45
CVP-207	Pharmacology	45 / 0 / 0 / 45
CVP-210	Clinical Practicum/Internship II	0 / 0 / 492 / 492

Subject Number	Summer Semester III Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
CVP-306	Sterile Techniques, Patient Safety & Instrumentation	15 / 0 / 0 / 15
CVP-307	Ethics/Research/Healthcare Quality	15 / 0 / 0 / 15
CVP-308	Biomedical Engineering/Mechanical Assist	45 / 0 / 0 / 45
CVP-309	Emergency Preparedness/Special Considerations	45 / 0 / 0 / 45
CVP-310	Clinical Practicum/Internship III	0 / 0 / 408 / 408
	Total Contact Hours	**420 / 0 / 1,257 / 1,677**

Description of Subjects by Semester

Fall Semester I

Cardiovascular Anatomy & Physiology I (CVP-101)

This Course is designed to provide students with a strong foundation in Anatomy and Physiology. This will be the basis for all other coursework in this program. The focus is primarily on Cardiovascular/Cardiopulmonary Anatomy and Physiology with special focus on hematology and coagulation. This is as prescribed by the standard curriculum provided by the AC-PE and CAAHEP.

Course Objectives:
As a result of the successful completion of the course, students will have a understanding of the following topics as they relate to the practice of extracorporeal circulation and Perfusion Technology:

- 1.A.1 Mediastinum Cardiovascular Anatomy
- 1.A.2 Heart
- 1.A.3 Cardiac Arteries, Veins, and Microcirculation
- 1.A.5 Major Arteries, Veins and Branches
- 1.A.6 Developmental and Cardiac Embryology
- 1.A.7 Vascular Embryology
- 1.C.1 Cardiovascular Physiology
- 1.C.2 Cardiovascular Hemodynamics

Course Requirements:
Students must earn the minimum grade of 77% to progress to the next semester and continue the program.

Prerequisite: Admission to the program

Contact Hours: 45

Pathology, Pathophysiology & Surgical Repair (CVP-102)

This Course focuses on Cardiovascular Pathophysiology, Pathology, and Surgical Repair. The goal is to provide students with a strong foundation in these core principles. Ideally, the knowledge gained from learning about these principles can help dictate how to approach Perfusion for these patients.

Course Objectives:
At the completion of this course, students should have a strong understanding of the following topics as they relate to Cardiovascular Pathology and Pathophysiology:

- 1.B.1 Adult Cardiac Valvular Pathology and Surgical Repair
- 1.B.2 Adult Coronary Artery Pathology
- I.B.3 Perfusion Techniques for Aortic Aneurysm/Dissections
- I.B.5. Congenital Heart Defects: Left to Right Shunts
- I.B.6 Congenital Heart Defects: Cyanotic Anomalies
- I.B.7 Congenital Heart Defects: Obstructive Anomalies
- I.B.8 Congenital Heart Defects: Miscellaneous Anomalies

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program

Contact Hours: 45

Perfusion Technology I (CVP-103)

This course is the foundation for the Perfusion Education program. It is a complement to the Clinical Practicum I (CVP-101). This course gives the students the didactic foundation to be successful in the Clinical Practicum. This Course is designed to provide students with a strong foundation in the practical practice of Perfusion Technology. Learning about the equipment itself as well as the instruments used to run Cardiopulmonary Bypass and Autotransfusion. This is the main course for the program and is an in-depth study of how Perfusion is practically conducted.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

- 9.A Historical Development of Perfusion
- 1.D.1 Pharmacodynamics and Pharmacokinetics
- 2.A.1 Perfusion Circuits
- 2.A.2 Tubing
- 2.A.3 Pumps
- 2.A.4 Extracorporeal Filters
- 2.A.5 Oxygenators
- 2.A.6 Heat Exchangers
- 2.A.7 Reservoirs
- 2.A.8 Hemoconcentrators/Ultrafilters/Dialysis
- 2.B.1 Conduct of Cardiopulmonary Bypass
- 2.B.2 CPB Cannulation and Monitoring
- 2.C. Adequacy of Perfusion
- 2.D.1 Cardioplegia Administration Techniques
- 2.D2 Cardioplegia Solutions
- 2.E Systemic Hypothermia
- 2.F.1 Standards of Perioperative Autologous Blood Collection and Admiration
- 2.F.2 Hemodilution
- 2.F.3 Autotransfusion
- 2.H.1 Assisted Venous Drainage
- 2.H.2 Selective Cerebral Perfusion

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program
Co-requisite: CVP-101

Contact Hours: 45

Laboratory Analysis (CVP-104)

This Course is designed to provide students with a strong foundation in laboratory analysis. Lab analysis is the guiding light for a Perfusionist during a CPB run. The focus is primarily on lab instrumentation and values. This course also takes a practical approach to show a student how hospital lab works in the background to help in patient care and outcomes.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

- 4.A Overview – Laboratory Analysis
- 4.B Laboratory Analysis- Special Chemistry
- 4.C Laboratory Analysis- Blood Chemistry
- 4.D Laboratory Analysis – Coagulation & Hematology

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program
Co-requisite: CVP-101

Contact Hours: 15

Medical Monitoring (CVP-105)

This Course is designed to provide students with a strong foundation in medical monitoring. Special emphasis will be given to OR patient monitoring as well as EKG/ECG, Arterial Line, PA Catheter Tracings, CVP Tracings.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

- *EKG*
- *Intra-Op Medical Monitoring*
- *Post-Op Medical Monitoring*

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program
Co-requisite: CVP-101

Contact Hours: 15

Clinical Practicum/Internship I (CVP-110)

This course is designed to give the students a look at the clinical side of Perfusion. The goal of the clinical practicum/internship is to take the didactic education the students are learning show the students how to use that in day-to-day clinical cases as a Perfusionist. This course begins with wet labs, to learn about Perfusion equipment and slowly progresses and allows students to get hands on experience in the clinical setting working with anesthesiologist, surgeons, and nursing to take care of patients and participate in clinical cases.

Course Objectives:
As a result of the successful completion of the course, students will gain a practical understanding and experience in the day-to-day operations of a Cardiovascular Operating from the perspective of a Clinical Perfusionist. Students will also be able to:

- Apply their knowledge, improve their practical Perfusion skills and achieve the required proficiency level on routinely performed Cardiovascular Cases at the various clinical site, using site-specific protocols
- Possess understanding and awareness of Cardiovascular Perfusion and its relationship to the rest of the hospital or institution
- To interact on a professional level with patients and healthcare staff

- Demonstrate the role of a Cardiovascular Perfusionist in patient management

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: Admission to the program
Co-requisite: CVP-101

Contact Hours: 357

Spring Semester II

Cardiovascular Anatomy and Physiology II (CVP-201)

This Course is designed to continue to build upon a strong foundation in Anatomy and Physiology. This will be the basis for all other coursework in this program. The focus is primarily on Cardiovascular/Cardiopulmonary Anatomy and Physiology with special focus on hematology and coagulation.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- 1.C.3 Renal Physiology
- 1.C.4 Ventilation, Oxygenation, Reparation
- 1.C.5 Myocardial Physiology
- 1.C.6 Hematology
- 1.A.4 Conduction System
- 1.B.4 Congestive Heart Failure

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: CVP-110

Co-requisite: CVP-210

Contact Hours: 45

Perfusion Technology II (CVP-203)

This Course is designed to build upon the student's foundation in the practical practice of Perfusion Technology. Learning about the equipment itself as well as the instruments used to run Cardiopulmonary Bypass and Autotransfusion. This is one of the main courses for the program and is an in-depth study how Perfusion is practically conducted. This course also has an industry component in it that exposes student to various industry leading products including but not limited to heart and lung machines, oxygenators, filters, etc.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

- 2.F.3 Autotransfusion
- 2.H.1 Assisted Venous Drainage
- 2.H.2 Selective Cerebral Perfusion
- 1.E Physics
- 1.C Chemistry

- Biochemistry
- 1.H.1 Immunology of Blood contact with Artificial Materials
- 1.H.2 Immunology of Reperfusion Injury
- 2.F.3.a High-volume Autologous Platelet Concentration
- 2.F.4 Low volume Autologous Platelet Concentration Systems
- 2.F.5 Pharmacological Interventions
- Industry Leading Components

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Course Prerequisite: CVP-110

Contact Hours: 45

Pharmacology (CVP-207)

This course is designed to focus on both pharmacokinetics and pharmacodynamics of the drugs used in Cardiovascular surgery. The study of how these drugs interact with each other and their effects on patients is examines with special focus on mechanism of action as well as sites of action.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

a. 1.D.2 Pharmacology of Anesthetic Agents
b. 1.D.3 Anti-Arrhythmic Pharmacology
c. 1.D.4 Inotropic & Vasopressor Pharmacology
d. 1.D.5 Vasodilators
e. 1.D.6 Pharmacological Treatment of Congestive Heart Failure (CHF)
f. 1.D.7 Antimicrobial Agents/Antibiotics
g. 1.D.8 Anticoagulants
h. 1.D.9 Heparin Induced Thrombocytopenia (HIT)
i. 1.D.10 Antithrombin Deficiency
j. 1.D.11 Chemotherapeutic, Immunosuppressive, Diabetic, and Miscellaneous Agents

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: CVP-110

Co-requisite: CVP-201

Contact Hours: 45

Clinical Practicum/Internship II (CVP-210)

This course is designed to give the students a look at the clinical side of Perfusion. The goal of the clinical practicum/internship is to take the didactic education the students are learning show the students how to use that in day-to-day clinical cases as a Perfusionist. This course begins with wet labs, to learn about Perfusion equipment and slowly progresses and allows students to get hands on experience in the clinical setting working with anesthesiologist, surgeons, and nursing to take care of patients and participate in clinical cases.

Course Objectives:
As a result of the successful completion of the course, students will gain a practical understanding and experience in the day-to-day operations of a Cardiovascular Operating from the perspective of a Clinical Perfusionist. Students will also be able to:

- Apply their knowledge, improve their practical Perfusion skills and achieve the required proficiency level on routinely performed Cardiovascular Cases at the various clinical site, using site-specific protocols
- Possess understanding and awareness of Cardiovascular Perfusion and its relationship to the rest of the hospital or institution
- To interact on a professional level with patients and healthcare staff
- Demonstrate the role of a Cardiovascular Perfusionist in patient management

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: CVP-110
Co-requisite: CVP-201

Contact Hours: 492

Summer Semester III

Sterile Techniques, Patient Safety & Instrumentation (CVP-306)

This Course is designed to give students a strong foundation in sterility and sterile techniques. Learning the best practices to ensure both the safety of themselves, other staff members, and most importantly the patients. This cause will also highlight strategies and best practices of coagulation management.

Course Objectives: As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

a) Sterility Overview
b) 6.A Blood/Fluid Exposure
c) 6.B Patient Safety
d) CVOR Instrumentation

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: CVP-210

Contact Hours: 15

Ethics/Research/Healthcare Quality (CVP-307)

This course is designed to introduce students to Medical Ethics, Research Methods, and overall Healthcare Quality. Coursework will focus on not only learning about ethical issues important to Perfusionists today but also goal orientated, and data driven research that shapes the practice of a Perfusionist currently. The course will also take a look at various OR staff members and how those positions interact and influence the day-to-day activities of a Perfusionist.

Course Objectives:
As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

a) 10.A Introduction to Research Methods
b) 8.A Medical Ethics
c) 7.A OR Staff
d) Anesthesiology
e) Nursing/Scrub Tech
f) PA/Nurse Practitioner/1st Assist
g) CQI for The Perfusionist
h) Business Practices Regulatory Agencies

Prerequisite: CVP-210

Contact Hours: 15

Biomedical Engineering/Mechanical Assist (CVP-308)

This course is designed to give the students a strong foundation in Mechanical Assist Devices and Circulatory Support. The emphasis is on the use of ECMO, VADs, Balloon Pumps, etc. The goal is to not only familiarize the student with these devices, but to also help the students learn about safety measures and optimal techniques for use of these devices.

Course Objectives: As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

a) 3.A Extracorporeal Life Support Techniques
b) 3.B Intra-Aortic Balloon Pumping (IABP)
c) 3.C Ventricular Assist Devices (VADs)
    a. Impella 2.5/5.0
d) 5.A Biomedical Instrumentation
e) 5.B Biophysical Transport Phenomenon
f) 5.C Biomedical Electrical Safety
g) 5.D Medical and Diagnostic Imaging Technology

Prerequisite: CVP-210

Contact Hours: 45

Emergency Preparedness/Special Considerations (CVP-309)

This Course is designed to provide students with a strong foundation in the practical practice of Perfusion Technology. Learning about the equipment itself as well as the instruments used to run Cardiopulmonary Bypass and Autotransfusion. This is the main course for the program and is an in-depth study how Perfusion is practically conducted.

Course Objectives: As a result of the successful completion of the course, students will have a strong understanding of the following concepts:

a. 2.G.1 Malignant Hyperthermia
b. 2.G.2 Perfusion of the Pregnant patient
c. 2.G.3 Sickle Cell and Other Blood Disorders
d. 2.G.4 Jehovah's Witness Patients
e. 2.G.5 Emerging Technologies/Techniques
f. 2.H Crisis Recourse Management
g. 2.K.1 Heart Transplantation: Donor Recipient Considerations
h. 2.K.2 Lung and Heart Lung Transplantation
i. 2.k.3 Liver Transplantation – Perfusion Support
j. 2.k.4 Solid Organ Procurement
k. 2.L.1 Isolated Limb Perfusion (ILP)

l. 2.L.2 Hyperthermic Intraperitoneal Chemotherapy (HIPEC)
m. 12 Emergency Preparedness

Prerequisite: CVP-210

Contact Hours: 45

Clinical Practicum/Internship III (CVP-310)

This course is designed to give the students a look at the clinical side of Perfusion. The goal of the clinical practicum/internship is to take the didactic education the students are learning show the students how to use that in day-to-day clinical cases as a Perfusionist. This course begins with wet labs, to learn about Perfusion equipment and slowly progresses and allows students to get hands on experience in the clinical setting working with anesthesiologist, surgeons, and nursing to take care of patients and participate in clinical cases.

Course Objectives: As a result of the successful completion of the course, students will gain a practical understanding and experience in the day-to-day operations of a Cardiovascular Operating from the perspective of a Clinical Perfusionist. Students will also be able to:

- Apply their knowledge, improve their practical Perfusion skills and achieve the required proficiency level on routinely performed Cardiovascular Cases at the various clinical site, using site-specific protocols
- Possess understanding and awareness of Cardiovascular Perfusion and its relationship to the rest of the hospital or institution
- To interact on a professional level with patients and healthcare staff
- Demonstrate the role of a Cardiovascular Perfusionist in patient management

Course Requirements:
Students must earn the minimum grade of 77% in this course to progress to the next semester and continue the program.

Prerequisite: CVP-210
Co-requisite: CVP-309

Contact Hours: 408

Length of Program: 51 weeks; Total Contact Hours: 1,677

Invasive Cardiovascular Technology

Program Description

The Invasive Cardiovascular Technology program is a ***certificate-level***, 51-week program divided into three semesters approximately 16 weeks in length – fall, spring, and summer. The program consists of didactic classroom, hands-on laboratory and clinical internship experience with coursework designed to build upon previous courses. Students will learn to become competent entry-level invasive cardiovascular technologists in the cognitive (knowledge), psychomotor (skills), and affective (behavior) learning domains and will be qualified to sit for national credentialing examination. Graduates may work in hospitals and in university teaching medical centers that perform life-saving cardiac catheterization laboratory procedures.

Programmatic Accreditation Status

The Invasive Cardiovascular Technology program is **programmatically accredited** by the Commission on Accreditation of Allied Health Education Programs (CAAHEP), upon the recommendation of the Joint Review Committee on Education in Cardiovascular Technology (JRC-CVT).

Contact Information:
Commission on Accreditation of Allied Health Education Programs
9355 - 113th St. N, #7709
Seminole, FL 33775
P: 727.210.2350
F: 727.210.2354
E: mail@caahep.org

Instructor Contact Information

Name: Kyle Ellington, AAS, RCIS
Phone: 469.814.3600
Fax: 469.814.3609
Email: Kyle.Ellington@BSWHealth.org
Office Location: Suite 5-504
Office Hours: Mon – Fri, 8:00 am - 3:30 pm

Textbooks and other Course Material:

- Sorajja, P., Lim, M. J., & Kern, M. J. (2019). *Kern's cardiac catheterization handbook* (7th ed.). Elsevier. ISBN-13: 978-0323597739
- Watson, S., & Gorski, K. A. (2022). *Invasive cardiology: A manual for Cath lab personnel* (5th ed.). Jones & Bartlett Learning. ISBN-13: 978-1284222111
- Cath Lab Case Review/YouTube Review
- ACVP- Scope of Practice for the Invasive Cardiovascular Specialist @ https://www.acp-online.org/
- Supplemental materials available online through Baylor Health Sciences Library

Program Outline

Subject Number	Fall Semester I Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
ICVT-101	Invasive Cardiovascular Technology I	90 / 0 / 0 / 90
ICVT-101L	Invasive Cardiovascular Technology Lab I	0 / 90 / 0 / 90
ICVT-107C	Invasive Cardiovascular Technology Internship I	0 / 0 / 340 / 340

Subject Number	Spring Semester II Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
ICVT-201	Invasive Cardiovascular Technology II	48 / 0 / 0 / 48
ICVT-201L	Invasive Cardiovascular Technology Lab II	0 / 48 / 0 / 48
ICVT-207C	Invasive Cardiovascular Technology Internship II	0 / 0 / 544 / 544

Subject Number	Summer Semester III Subject Title	Contact Hours Lecture/Lab/Internship/Total Hours
ICVT-301	Invasive Cardiovascular Technology III	45 / 0 / 0 / 45
ICVT-301L	Invasive Cardiovascular Technology Lab III	0 / 45 / 0 / 45
ICVT-307C	Invasive Cardiovascular Technology Internship III	0 / 0 / 493 / 493
	Total Contact Hours	183 / 183 / 1,377 / 1,743

Description of Subjects by Semester

Fall – Semester I

Invasive Cardiovascular Technology I (ICVT-101)

Course Description:
The student will be introduced to the physical and technical concepts commonly performed in the cardiac catheterization laboratory. Core concepts include the roles and responsibilities of the invasive specialist when monitoring, circulating and scrubbing during the invasive procedure. In addition, the importance of radiation safety, teamwork, patient safety, and infection control will be discussed. The student will learn how to assemble equipment and develop psychomotor skills in donning and doffing a sterile environment. Occupational safety, legal procedures, and ethical considerations will be discussed.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Describe the role and scope of practice of the invasive specialist
- Identify the central and peripheral arterial and venous circulation
- Describe the role of the sympathetic and parasympathetic nervous system
- List the types of procedures that are performed in the invasive lab
- Describe cardiac drugs that are used to treat heart disease
- Define HIPAA and patient confidentiality and compliance
- Discuss intra-procedural strategies for protection from radiation exposure
- Describe the role of OSHA, infection control, and safety
- Describe the importance of teamwork when caring for the patient
- Explain how cardiovascular disease develops and progresses
- Describe the legal responsibilities of a healthcare provider
- Identify the relationship between cardiac chambers and vessels
- Define cardiac structures, including chambers and valves
- List the electrical pathway of the heart's conduction system
- Explain heart arrhythmias associated with coronary artery disease
- Define the waveforms displayed on the electrocardiogram
- List common antiarrhythmic drugs for the treatment of life-threatening arrhythmias
- Explain cardiac physiology including the cardiac cycle and basic heart pressures
- Describe the findings of diagnostic testing in the invasive laboratory
- Explain how angiography is used during the invasive procedure
- Analyze the components of cardiac event timing (Wiggers diagram)
- Describe coronary artery perfusion and its relationship to disease
- Analyze 2-dimensional X-ray images obtained during fluoroscopy
- Identify disease of the coronary arteries that is discovered during the invasive procedure
- Describe the mechanism of kidney function for the regulation of blood pressure

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: Admission to the program
Co-requisite: ICVT-101L Invasive Cardiovascular Technology I Lab, ICVT-107C Invasive Cardiovascular Technology Internship I
Contact Hours: 90

Invasive Cardiovascular Technology I Lab (ICVT-101L)

Course Description:
The student will be introduced to the physical and technical concepts commonly performed in the cardiac catheterization laboratory. Core concepts include the roles and responsibilities of the invasive specialist when monitoring, circulating, and scrubbing during the invasive procedure. In addition, the importance of radiation safety, teamwork, patient safety, and infection control will be discussed. The student will learn how to assemble equipment and develop psychomotor skills in donning and doffing a sterile environment.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Demonstrate how to obtain patient vitals
- Demonstrate proper use of PACS system for transfer of patient demographics
- List the protective equipment required during the invasive procedure
- Discuss the activities that must occur during a "time out"
- List the procedures that are commonly performed in the cardiac catheterization laboratory
- Describe cardiovascular drugs that are used during invasive procedures
- Demonstrate how to prepare the patient for the invasive procedure
- List the safety protocols and procedures required in the invasive lab
- Demonstrate how to approach the patient with respect and modesty
- List the necessary protocols required for asepsis and sterilization techniques
- Demonstrate how to triage a patient after the invasive test is performed
- Practice environmental safety when exposed to radiation
- Analyze heart rhythm waveforms to determine disease
- Demonstrate OSHA infection control and safety in the invasive lab
- List equipment required to perform invasive heart and vascular procedures
- Demonstrate how to prepare a sterile apparatus for invasive procedures
- Demonstrate rules and regulations of radiation safety during invasive procedures
- Demonstrate sterilization techniques, proper handwashing in preparation for the sterile environment

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: Admission to the program
Co-requisite: ICVT-101 Invasive Cardiovascular Technology I, ICVT-107C Invasive Cardiovascular Technology Internship I
Contact Hours: 90

Invasive Cardiovascular Technology Internship I (ICVT-107C)

Course Description:
This is the first of three consecutive clinical courses providing an internship of supervised clinical practicum hours which prepares the student in the cognitive (knowledge), psychomotor (skills) and affective (behavior) learning domains for Invasive Cardiovascular Technology. The clinical internship introduces the student to the essential skills necessary to perform the role of an invasive cardiovascular specialist. The student will assist the team members with all elements of invasive testing. The combination of observation, and hands-on experience, links didactic education with "real world" clinical education.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Demonstrate how to approach the patient with respect, compassion, and decorum
- Assist in manipulating imaging equipment during invasive cardiovascular procedures
- Select and prepare the appropriate equipment for cardiac hemodynamic measurements
- Assist team members in the setup and preparation of the patient for the invasive procedure
- Demonstrate how to position a patient during the invasive procedure
- Demonstrate how to perform a 12-lead ECG
- Analyze heart rhythms during the invasive procedure
- Assist in the operation of fluoroscopic X-ray equipment
- Demonstrate how to obtain patient vitals and where to document them
- Describe cardiovascular drugs that are used during invasive testing
- Assist team members during the invasive procedure
- Demonstrate how to prepare the patient for the invasive procedure
- List the safety protocols and procedures required in the invasive lab
- List the signs and symptoms of compromise respiratory status
- Demonstrate how to maintain professionalism and composure during a cardiac emergency
- List the necessary protocols required for asepsis and sterilization techniques
- List the procedure that is followed during a patient emergency
- Demonstrate proper hygiene and handwashing techniques
- Demonstrate how to transfer a patient from a stretcher to the lab table
- Analyze heart catheterization images and interpret for the presence of disease
- Demonstrate OSHA infection control and safety in the clinical environment
- List equipment required to perform invasive heart and vascular procedures
- Demonstrate how to establish the patient's airway and apply oxygen
- Exhibit teamwork and skills necessary to perform the invasive test
- Recognize changes in a patient's vitals that are life-threatening
- Demonstrate how to prepare a sterile apparatus for invasive procedures
- Demonstrate radiation safety during invasive procedures
- Recognize complications associated with the invasive procedure
- Demonstrate sterilization techniques and hand washing
- Develop the skills to anticipate the needs of the team members during the invasive procedure
- Demonstrate post-procedural care of the patient

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: Admission to the program
Co-requisite: ICVT-101 Invasive Cardiovascular Technology I, ICVT-101L Invasive Cardiovascular Technology I Lab
Contact Hours: 340

Spring-Semester II

Invasive Cardiovascular Technology II (ICVT-201)

Course Description:
Invasive tools and methods to assess CAD include a multi-access approach to percutaneous coronary intervention (PCI). Topics include invasive hemodynamics, emphasizing calculations used to diagnose cardiovascular disease. Additional topics include emergencies encountered during the invasive procedure and the role of distal embolization and protection, atherectomy, and thrombectomy. Advanced procedures, including transcatheter valve replacement and adjunct imaging, will be discussed.

Course Objectives:

As a result of the successful completion of the course, students will be able to:

- Describe how PCI is performed during an ST-segment elevation myocardial infarction (STEMI)
- Analyze rhythms and images of acute coronary syndrome and STEMI
- Describe the difference between STEMI and Non-STEMI (NSTEMI)
- List the differential diagnosis in non-cardiac related chest pain
- Identify normal and abnormal catheter pressure tracings
- Describe how invasive hemodynamics are measured
- List the tests that measure hemodynamics during the invasive procedure
- Describe how event timing changes in cardiac disease
- Describe how to diagnose CAD during the invasive procedure
- Explain how percutaneous balloon valvuloplasty, repair, and replacement are preformed
- Analyze 2-dimensional X-ray images obtained during fluoroscopy
- Describe how atherectomy and thrombectomy are preformed
- Explain the role of transesophageal echocardiography during transcatheter procedures
- Describe how distal embolization occurs
- Analyzes case studies of cardiovascular disease
- Describe the results of the diagnostic testing
- Describe coronary artery perfusion and its relationship to disease

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-101 Invasive Cardiovascular Technology I, ICVT-101L Invasive Cardiovascular Technology I Lab, ICVT-107C Invasive Cardiovascular Technology Internship I
Co-requisite: ICVT-201L Invasive Cardiovascular Technology II Lab, ICVT-207C Invasive Cardiovascular Technology Internship II

Contact Hours: 48

Invasive Cardiovascular Technology Lab II (ICVT-201L)

Course Description:
The student will continue to practice conventional and advanced techniques commonly performed during the invasive procedure. Emphasis will be on the invasive specialist's role, including monitoring the patient, circulating the sterile field, and scrubbing during the procedure. Additional topics include congenital heart defects and interventions, alcohol septal ablation therapy, hemostasis, vascular closure devices, and carotid interventions. The student will prepare for advanced cardiac life support (ACLS) certification.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Describe the role of monitoring during the procedure
- Demonstrate how to assist in the sterile field during the procedure
- Analyze cardiac rhythms during the monitoring of the patient
- Demonstrate how to interpret cardiac rhythms in acute coronary syndrome
- Analyze intracardiac pressure tracings during the procedure
- Demonstrate how to maintain asepsis in the sterile field
- Analyze 2-dimensional X-ray images obtained during fluoroscopy
- Describe how carotid interventions are performed
- Identify normal and abnormal catheter pressure tracings
- Demonstrate how to doff and don during the procedure
- Analyzes case studies of cardiovascular disease
- Describe the role of the cath lab team during ACLS

- Demonstrate how to assist during the vascular closure-post procedure

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-101 Invasive Cardiovascular Technology I, ICVT-101L Invasive Cardiovascular Technology I Lab, ICVT-107C Invasive Cardiovascular Technology Internship I
Co-requisite: ICVT-201 Invasive Cardiovascular Technology II, ICVT-207C Invasive Cardiovascular Technology Internship II

Contact Hours: 48

Invasive Cardiovascular Technology Internship II (ICVT 207C)

Course Description:
This is the second of three consecutive clinical courses providing an internship of supervised clinical practicum hours which prepares the student in the cognitive (knowledge), psychomotor (skills) and affective (behavior) learning domains for Invasive Cardiovascular Technology. The clinical internship introduces the student to the essential skills necessary to perform the role of an invasive cardiovascular specialist. The student will assist the team members with all elements of invasive testing. The combination of observation, and hands-on experience, links didactic education with "real world" clinical education.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Demonstrate how to operate fluoroscopic X-ray equipment
- Assist team members in the set up and preparation of patient for the invasive procedure
- Demonstrate how to manipulate imaging equipment during invasive cardiovascular procedures
- Select and prepare the appropriate equipment for cardiac hemodynamic measurements
- Demonstrate how to position a patient during the invasive procedure
- Analyze heart rhythms during the invasive procedure
- Demonstrate how to obtain patient vitals during the interventional procedure
- Exhibit professionalism and compassionate care for the patient
- Assist team members during the invasive procedure
- Preform safety protocols and procedures during the interventional procedure
- Demonstrate how to maintain professionalism and composure during a cardiac emergency
- List the protocols required for asepsis and sterilization techniques
- Demonstrate proper hygiene and hand washing techniques
- Analyze heart catheterization images and interpret for the presence of disease
- Demonstrate OSHA infection control and safety in the clinical environment
- List equipment required to perform invasive heart and vascular procedures
- Exhibit teamwork and skills necessary to perform the invasive test
- Demonstrate how to prepare a sterile apparatus for invasive procedures
- Demonstrate radiation safety during invasive procedures

Course Requirements:
Students must earn the minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-101 Invasive Cardiovascular Technology I, ICVT-101L Invasive Cardiovascular Technology I Lab, ICVT-107C Invasive Cardiovascular Technology Internship I
Co-requisite: ICVT-201 Invasive Cardiovascular Technology II, ICVT-201L Invasive Cardiovascular Technology II Lab

Contact Hours: 544

Summer-Semester III

Invasive Cardiovascular Technology III (ICVT-301)

Course Description:
This course includes an overview of foreign body retrieval, advanced electrophysiology, pacing techniques, implantable cardioverter defibrillators, cardiac resynchronization, percutaneous carotid, renal, and peripheral angiography, and renal and peripheral artery intervention. The role of intra-aortic balloon pumps and other cardiac assist devices will be discussed. In addition, the student will prepare for the invasive cardiovascular specialist (RCIS) international registry exam and advanced cardiac life support (ACLS) certification.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- List the testing used during the retrieval of foreign bodies in the cardiovascular system
- Describe how electrocardiography pacing and resynchronization improve heart function
- Analyze heart rhythms related to pacing techniques
- Describe how a foreign body is removed from the body
- List the types of foreign bodies that can be found within the body post invasive procedures
- List the most common arrhythmias that can develop during an angiogram
- Describe how a carotid intervention is performed
- List the tools required to perform renal and peripheral interventions
- Describe how the intra-aortic balloon pump (IABP) assists the cardiovascular system
- Describe various left ventricular assist device (LVAD) systems, including Impella® and Tandem Heart®
- List the waveforms seen on various IABP
- Analyze cases that include IABP during the invasive procedure
- Demonstrate how to prepare for the invasive cardiovascular registry exam
- Describe the role of the team members during ACLS
- Demonstrate how to perform ACLS

Course Requirements:
Students must earn a minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-201 Invasive Cardiovascular Technology II, ICVT-201L Invasive Cardiovascular Technology II Lab, ICVT-207C Invasive Cardiovascular Technology Internship II
Co-requisite: ICVT-301L Invasive Cardiovascular Technology III Lab, ICVT-307C Invasive Cardiovascular Technology Internship III

Contact Hours: 45

Invasive Cardiovascular Technology Lab III (ICVT-301L)

Course Description:
The student will continue to demonstrate the skills and competencies required to perform invasive cardiovascular procedures. Role-playing in preparation for ACLS certification will occur.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Demonstrate how to perform ACLS
- Describe the role of the invasive specialist during ACLS
- Demonstrate how to assist team members in the setup and preparation of a patient for the invasive procedure
- Preform safety protocols and procedures during the interventional procedure

- Demonstrate how to maintain professionalism and composure during a cardiac emergency
- Demonstrate OSHA infection control and safety during invasive procedures
- Demonstrate how to assist during the vascular closure-post procedure
- Demonstrate how to circulate during invasive procedures
- Demonstrate how to doff and don during interventional procedures
- Demonstrate successful completion of ACLS certification

Course Requirements:
Students must earn the minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-201 Invasive Cardiovascular Technology II, ICVT-201L Invasive Cardiovascular Technology II Lab, ICVT-207C Invasive Cardiovascular Technology Internship II
Co-requisite: ICVT-301 Invasive Cardiovascular Technology III, ICVT-307C Invasive Cardiovascular Technology Internship III

Contact Hours: 45

Invasive Cardiovascular Technology Internship III (ICVT-307C)

Course Description:
This is the third of three clinical courses providing an internship of supervised clinical practicum hours which prepares the student in the cognitive (knowledge), psychomotor (skills) and affective (behavior) learning domains for Invasive Cardiovascular Technology. The clinical internship introduces the student to the essential skills necessary to perform the role of an invasive cardiovascular specialist. The student will assist the team members with all elements of invasive testing. The combination of observation, and hands-on experience, links didactic education with "real world" clinical education. The third and final clinical internship allows the student to continue to refine the invasive skills required to perform successful interventional studies. The student will attempt the RCIS registry exam.

Course Objectives:
As a result of the successful completion of the course, students will be able to:

- Demonstrate how to prepare a sterile field for invasive procedures
- Analyze fluoroscopy imaging during the interventional procedure
- Demonstrate how to operate fluoroscopic X-ray equipment
- Display how to set up the non-sterile lab in preparation for invasive procedures
- Show how to perform a "time out" for safety during the invasive procedure
- Manipulate imaging equipment during invasive cardiovascular procedures
- Prepare the appropriate equipment for cardiac hemodynamic measurements
- Demonstrate how to position a patient during the invasive procedure
- Demonstrate how to protect the sterile field from contamination during the invasive procedure
- Analyze heart rhythms during the invasive procedure
- Display how to obtain patient vitals during the interventional procedure
- Exhibit professionalism and compassionate care for the patient
- Show how to handle cardiovascular drugs during the interventional procedure
- Perform safety protocols and procedures during the interventional procedure
- Demonstrate how to maintain professionalism and composure during a cardiac emergency
- List the protocols required for asepsis and sterilization techniques
- Demonstrate proper hygiene and handwashing techniques
- Assist the interventional cardiologist during the invasive procedure
- Demonstrate OSHA infection control and safety in the clinical environment
- Exhibit teamwork and skills necessary to perform the invasive test

- Demonstrate radiation safety during invasive procedures
- Attempt the invasive registry exam

Course Requirements:
Students must earn the minimum grade of 77% to progress to the next semester and continue the program.

Pre-requisite: ICVT-201 Invasive Cardiovascular Technology II, ICVT-201L Invasive Cardiovascular Technology II Lab, ICVT-207C Invasive Cardiovascular Technology Internship II
Co-requisite: ICVT-301 Invasive Cardiovascular Technology III, ICVT-301L Invasive Cardiovascular Technology III Lab

Contact Hours: 493

Length of Program: 51 weeks, Total Contact Hours: 1,743

General Information

Student Grievance Policy

Many student complaints can be resolved through discussion with the appropriate instructor or staff member, and we encourage students to make contact at the first indication of a problem or concern. This section describes the steps the student should follow so that a problem can be fully and fairly investigated and addressed. The student will not be bound by any resolution unless the student agrees to accept it.

Importantly, the student must pursue his or her claim through this grievance procedure first. Please note: This grievance procedure is intended for problems concerning a student's recruitment, enrollment, attendance, education, or the educational process or other school matters. It does not apply to student complaints or grievances regarding grades or sexual harassment, which are addressed in other sections of this Student Catalog. The school will receive all information submitted by the student concerning a grievance in strict confidence and the school and the student agree to maintain confidentiality in the grievance procedures. No reprisals of any kind will be taken by any party of interest or by any member of The Cardiovascular Institute administration against any party involved. The school will investigate all complaints or grievances fully and promptly.

Step 1: Grievances or complaints involving an individual instructor or staff member should first be discussed with the individual involved. Grievances or complaints involving a policy or class should first be discussed with the individual enforcing that policy, the class instructor, or the Program Director.

Step 2: If the matter is not resolved to the student's satisfaction in Step 1, the student may submit a written, dated, and signed statement of the grievance or complaint and a description of the actions that have taken place thus far to the next level of authority directly or through the program's Medical Director.

Student Grievance Procedure

This grievance procedure is designed to address problems promptly and without undue delay. In order to achieve that, the student must initiate Step 1 within ten (10) business days of the incident or circumstance(s) giving rise to the complaint and must initiate Step 2 within ten (10) business days after receiving a response, or if more than twenty (20) business days have passed with no response. If the student fails to take any of the steps in this procedure within the required timeframes, then the student will be deemed to have accepted the resolution last proposed by the Cardiovascular Institute. If the Cardiovascular Institute fails to act within the timeframes described in this procedure, then the student

may follow the posted Texas Workforce Commission (TWC) grievance policies and/or contact them directly at:

Reference TWC School #5753

TWC Career Schools & Colleges
101 East 15th Street, Room 226T
Austin, TX 78778-0001
Tel: 512.936.3100
Fax: 512.936.3111

Financial Aid Information

Financial Assistance

The Cardiovascular Institute ***does not offer*** conventional Federal Student Financial Aid. Students must find and secure financing on their own.

However, the Baylor Health Care System Credit Union (BHCSCU), a separate entity from the Cardiovascular Institute, has agreed to offer conventional personal loans for the amount of tuition only to those students who:

1. have been accepted into (not just applied) one of the programs at the Cardiovascular Institute and,
2. have a good credit history.

According to BHCSCU terms, loan payments are deferred for a total of 15 months, provided the student remains in school, before a regular loan payment schedule goes into effect. Cost-of-living expenses are not included in the loan amount and the student should take this into account when considering their total educational expenses.

The loan agreement, terms and repayment schedule are exclusively between the BHCSCU and students.

Contact Information:

BHCS Credit Union
4005 Crutcher Street, Ste 130
Dallas, TX 75246-2122
469.676.2200
https://bhcscu.com/

The school also offers the following list of financial lenders below for convenience. Students are welcome to use any lender they choose.

Ascent	https://ascentstudentloans.com/
Credible	https://www.credible.com/student-loans
Discover	https://www.discover.com/student-loans/
Meritize	https://www.meritize.com/students/
Sallie Mae	https://www.salliemae.com/student-loans/
Wells Fargo	https://www.wellsfargo.com/student/
U-fi	https://u-fi.com/

Academic Information

Transfer of Credit to/from Other Schools

The Cardiovascular Institute is a certificate-level program and does not accept credits from outside institutions.

Advanced Placement & Experiential Credit

There is no advanced placement credit given for significant academic or experiential clinical experience.

Attendance Policy

Attendance affects the quality of a student's academic performance. Therefore, prompt, and regular attendance in all lectures and lab sessions is expected of every student. Students participate in real patient care and procedures at clinical affiliate sites. In order to safely and competently perform such patient care, the students must first receive appropriate academic instruction and lab practice at the Cardiovascular Institute. Student's absence from class or labs could affect clinical competence and possibly compromise patient safety at these hospital sites. For these reasons, full attendance is expected for all classes and clinical education. Five or more **excused** absences from class in one semester will result in the student's final average being dropped by one letter grade. Ten or more **excused** absences from class in one semester will result in student termination from the program.

Absences are considered **excused** in the event of emergency situations such as sudden illness, family emergency or motor vehicle accident, if the student makes every effort to inform the Program Director, Clinical Coordinator, and/or clinical Site Supervisor (as appropriate for classroom or clinical days). A doctor's note or other documentation (e.g. positive COVID-19 test) will be required for illnesses, as deemed appropriate by the Program Director or Clinical Coordinator.

Absences are considered **unexcused** if the student fails to notify their instructor, clinical site, or school administrator of their absence (no call, no show). **As outlined in each course syllabus, three unexcused absences in one semester will result in failure of that class or lab, which will result in expulsion of the student from their respective program.**

All missed clinical time will be made up at the **next available scheduled school holiday or school break**, at the discretion of the Program Director or Clinical Coordinator and must be arranged with the clinical Site Supervisor of their current rotation. The final week to make up missed Summer clinical time is during the one-week intersession period following graduation and **all missed time must be made up in order for the student to graduate**.

Academic Honesty Policy

Academic integrity means honesty and responsibility in scholarship. Here are the basic assumptions about academic work at the Cardiovascular Institute:

1. Students attend this school in order to learn about field of adult echocardiography and grow professionally,
2. Academic assignments and competencies exist for the sake of this goal,
3. Grades exist to show how fully the goal is attained and,
4. Thus, all work and all grades should result from the *student's own effort* to learn and grow.

Academic work completed any other way is pointless, and grades obtained any other way are fraudulent.

Academic integrity means understanding and respecting these basic truths. Academic misconduct—"cheating"—is not just "against the rules." It violates the assumptions at the heart of all learning. It

destroys the mutual trust and respect that should exist between student and professor. Finally, it is unfair to students who earn their grades honestly.

Academic dishonesty is a completely unacceptable mode of conduct and persons involved in academic dishonesty or found falsifying any documents of any kind, including attendance, may result in dismissal from the program.

Student Code of Conduct Policy

The Cardiovascular Institute is an academic community committed to the educational and personal growth of its students. Behavior that infringes upon rights, safety, or privileges, or that impedes the educational process is unacceptable and may lead to sanctions up to and including expulsion from the school.

Students should exhibit a strong intellectual curiosity in order to apply the theories of cardiovascular technology to helping people. They should be interested in developing excellent psychomotor skills in working with their hands, equipment coordination, and constantly learning new skills and information about the human heart. Physical as well as mental health should be maintained. Handling stressful situations regarding patients as well as fellow health care professionals in a working environment should be developed with a positive attitude.

Effective communication as well as listening, working effectively with medical personnel, and working as part of a team, are skills that must be developed and maintained. Good phone etiquette should always be observed. Students finding satisfaction in their studies and in helping patients will develop a sensitive and giving tenacious attitude and will seek the best results for their patients. The student should have a positive attitude about the student's training and should NOT speak negatively about any aspect of his or her training publicly. Counseling sessions between the students and the Cardiovascular Institute faculty can be arranged for this reason.

Substance Abuse in the Workplace (Drug Free Workplace) Policy

The CVI will follow the BSWH policy titled, "Substance Abuse in the Workplace (Drug Free Workplace)" for all students and faculty. CVI faculty, as BSWH employees, are subject to the entirety of the policy. The portions of the policy that pertain **specifically to CVI students** are as follows with any clarifying language added to the original BSWH policy in ***bold italics***:

DEFINITIONS

Negative Dilute Result – dilute specimen where a specimen with creatinine and specific gravity values that are lower than expected.

Negative Result – the result reported by a U.S. Department of Health and Human Services ("HHS")-certified laboratory when a specimen contains no drug or the concentration of the drug is less than the cutoff concentration for the drug or drug class and the specimen is a valid specimen.

Non-Employed Individuals – any paid or un-paid individual engaged to provide services to BSWH including but not limited to: Contingent Workers, contractors, volunteers, and/or any other non-employees as determined by BSWH***, including CVI enrolled students.***

Positive Result – the result reported by an HHS-certified laboratory when a specimen contains a drug or drug metabolite equal to or greater than the cutoff concentrations and is determined positive by the MRO. Including Positive Dilute Results or a second diluted specimen.

Prohibited Substances – may include alcohol and any drug obtained illegally or legally. Prohibited Substances do not include prescription substances used in a prescribed manner.

Reasonable Suspicion – a reasonable belief, based on observation or other reliable information that an individual is in violation of this Policy.

Screen ("Screening") – a test to determine whether an individual violated this Policy based on a sample of the following: urine, blood, hair, saliva, and/or breath.

POLICY

BSWH maintains a workplace free of alcohol, illegal drugs, and the abuse of legal drugs, and therefore Applicants, employees, and Non-Employed Individuals ***such as CVI students*** (collectively, "individuals") are prohibited from:

- Possessing, using, or being under the influence of Prohibited Substances while working or performing services for BSWH and/or on BSWH property
- Possession or use of paraphernalia related to the use of Prohibited Substances while working or performing services and/or on BSWH property
- Involvement in activities relating to the manufacturing, selling, or transferring of Prohibited Substances, or any paraphernalia related to the use of Prohibited Substances while working or performing services for BSWH and/or on BSWH property

Searches for Prohibited Substances

- Although BSWH respects an individual's privacy, that individual should have no reasonable expectation of privacy regarding work-related conduct or the use of BSWH property and equipment. This includes searches of offices, desks, lockers, and other BSWH property and, under certain circumstances, personal property, including but not limited to, bags, briefcases, purses, backpacks, and satchels. BSWH expects full cooperation by all individuals asked to undergo a search based upon Reasonable Suspicion.
- If an individual does not cooperate, BSWH ***and CVI administration*** may take appropriate action.
- If the search produces evidence that the individual violated this Policy, BSWH ***and CVI administration*** may take appropriate action.

Screening for Prohibited Substances

BSWH expects full cooperation by all individuals asked to undergo a Screen. BSWH performs Screens under the following circumstances. BSWH Employee Health Services and/or an approved third-party vendor perform all Screenings.

Initial (Post Offer/Pre-Employment/*Immediately post-CVI program enrollment*)

- ***Since all CVI students will be involved in direct patient care, BSWH and all clinical affiliates require a negative drug screen prior to allowing a student to rotate at a clinical site***

For-Cause Screening

- BSWH may perform a for-cause Screening on employees and Non-Employed Individuals ***such as CVI students***.
- For-cause screening must be based on Reasonable Suspicion.
  - Reasonable Suspicion includes individual(s) exhibiting clinical signs, behavior, or conduct that could be consistent with use of Prohibited Substances or violation or potential violation of BSWH policy.
  - Reasonable Suspicion may also include an individual or group based on an activity or event in violation or potential violation of BSWH policy.
- Upon selection and notification of For-Cause Screening, the individual must immediately proceed to the designated Screening location and undergo Screening.
- An individual who has been asked to undergo for For-Cause Screening may be placed on suspension immediately pending the results of the Screening or may be allowed to continue work

at ***CVI administration*** discretion depending on the activity or event that triggered the need for For-Cause Screening.

Random Screening

- BSWH may perform random Screening on all employees and Non-Employed Individuals ***such as CVI students*** by a scientifically valid method. Additionally, certain departments may have heightened random drug screening requirements.
- Upon selection and notification for random Screening, the individual must immediately proceed to the designated Screening location and undergo Screening. The individual notifies their supervisor/manager and, as applicable, hands-off their assignment/patients.

Drug Screen Results other than Negative

BSWH complies with all Federal and state laws and regulations including licensing agency rules regarding the reporting of any violation of this Policy.

Positive Results (including Positive Dilute Results)

- ***The CVI student's offer for a seat in the class is rescinded for a positive initial screening, or the student may be terminated from the program for a positive result at any time during the program.***

Negative Dilute Results

- If the first Screen is a Negative Dilute Result, a second Screen is completed.
- If the second Screen is also a Negative Dilute Result:
  - ***The CVI student's offer for a seat in the class is rescinded for a Negative Dilute Result at the initial screening, or the student may be terminated from the program for a Negative Dilute Result at any time during the program.***

Protesting Results

An individual wishing to protest Screening results must do so by submitting a written request to ***CVI administration***. Individuals requesting re-testing of are required to pay for the re-testing. The original specimen is sent to an independent laboratory and results from the re-testing are sent to Employee Health Services ***and CVI administration*** for review.

Refusal to Cooperate

If an individual refuses to cooperate or comply with this Policy, including refusing to provide a sample, the employee may face separation from employment and the Non-Employed Individual may no longer provide services. ***For CVI students, the student may be terminated from the program.***

Drug-Free Awareness Program

In order to increase awareness of this Policy, BSWH publishes this Policy on the BSWH intranet and may provide additional education and training as necessary. Further, BSWH may provide information on available drug counseling, rehabilitation, and employee assistance programs.

Personal Mobile Devices at Clinical Site Policy

Human factors studies indicate that distractions and multitasking increase the likelihood of error. Allowing students to bring their cell phones, smartphones, or other mobile devices into the clinical environment introduces a new distraction into an already complex, noisy, high-stakes environment. This policy prohibits all Cardiovascular Institute students from bringing their personal mobile devices into the lab or any other rooms where procedures are performed on patients. Students are to use mobile devices to interact with the Trajecsys clinical tracking system or while on breaks and away from clinical patients. They must store their devices in a locker or wherever they keep their other belongings.

If someone urgently needs to reach a student, they can call the main lab desk and request that the call be put through to the student. It is the student's responsibility to share that number with those who may need to contact them in an emergency situation.

Violation of this policy will result in the following:

First instance:	Failing grade on your subsequent clinical evaluation.
Second instance:	A letter of probation will be issued.
	Students' final average will be dropped by one letter grade.
Third instance:	Dismissal from the program.

Special exceptions will be considered. Please contact your program director to make a request.

Social Media Policy

It cannot be overstated that students MAY NOT TAKE OR POST pictures, videos, scenarios, or any other clinically related digital content on ANY PLATFORM of social media that might contain identifying patient information. Doing so is a violation of HIPAA as well as a breach of the student code of conduct. Violation of this policy may lead to failure of the clinical course and possible dismissal from the program.

Inclement Weather Policy

All three components of education – Didactic Classroom, Skills Lab & Clinical Education - are crucial to the complete development of the Allied Health professional in the cognitive (*knowledge*), psychomotor (*physical skills*) and affective (*behaviors*) learning domains. The student should, therefore, make every effort to attend the classroom, skills lab and clinical site when scheduled to do so.

However, if severe weather impacts the DFW metroplex, administration at the Cardiovascular Institute will attempt to determine if travel conditions in the area are reasonably safe for students to commute. Administration will closely monitor the closings of independent school districts and colleges local to both the main campus and clinical affiliates, as well as local news weather reports in making a final determination on closing the school on a day-by-day basis. Once a decision has been made to close the school for the day, students will be notified as soon as possible via Canvas, Microsoft Teams, text, or any other pre-established communication method with the class.

A maximum of three (3) clinical days may be missed if the school administration decides to cancel clinicals due to inclement weather. These days will be applicable only if the school administration closes the school. Beyond three days, the missed clinical days will need to be made up during regular operating hours of the clinical site over Christmas Break, Spring Break and/or the Summer Break. If the school closure occurs on a regular class day, classes may be held virtually, cancelled altogether, or moved to another day of the week when school resumes, as determined by the Program Director.

Student Notification of Clinical Site Tardiness or Absence Policy

The clinical environment is intended to simulate the working environment of the Allied Health professional, and the student is strongly discouraged from being late to their assigned clinical site. If the student will be more than 5 minutes late *or* absent for clinical education, he or she is obligated to contact the Clinical Site Supervisor and Clinical Coordinator prior to the time of scheduled arrival. Lack of notification, chronic tardiness or chronic absences will result in disciplinary action.

Employment Disclosure

The Cardiovascular Institute does not guarantee or promise employment at the completion of the program and has no placement assistance program.

Student Housing

The Cardiovascular Institute does not provide or assist in student housing.

Program Technical Standards

Purpose

The following Standards, Demands and Skills are the cornerstone of the healthcare environment. Standards are not conditions for admission to the program, but they do indicate abilities and characteristics that are necessary to successfully complete the requirements of the programs at the Cardiovascular Institute.

Behavioral Standards (All Programs)

With or without reasonable accommodations, the student must be able to accomplish the following safely, efficiently, and competently:

- Demonstrate appropriate responses to situations involving the critically ill, medical emergencies and death.
- Prioritize and manage multiple tasks simultaneously.
- Understand and apply clinical instruction from department personnel.
- Interact effectively with patients, families, supervisors and co-workers of the same and diverse cultures by demonstrating such qualities as respect, politeness, collaboration, teamwork and discretion.

Physical, Interpersonal, Communication, Mobility, Tactical, Hearing and Visual Demands (By Program)

Adult Echocardiography

- Reaching to position and/or roll patients from side to side when necessary
- Lift or transfer patients out of a wheelchair, stretcher, and other devices
- Pushing, pulling heavy equipment including ultrasound machines, patient gurneys and other cardiovascular equipment
- Visual monitoring of patient in dim light
- Accurately analyze imaging and instrumentation monitors to acquire images of patient's anatomy at appropriate level within level of training
- Differentiate among subtle shades of color and grayscale used in imaging and other cardiovascular procedures
- Verbally explain a cardiovascular imaging examination or cardiovascular procedure to groups of medical professionals for critique, education, and conferences
- Interpretation and analysis of data from patient charts and confirm procedural requests
- Correlate data for the purpose of performing an examination or cardiovascular procedure according to protocol, professional guidelines and hospital policies and procedures
- Accurately perform cardiovascular procedures appropriate within level of training
- Manipulate mechanical and patient care equipment. i.e., keyboards, dials, switches, push buttons, plug in devices and blood pressure equipment
- Utilize devices such as laser printers and have a working knowledge of digital devices such as personal computers, tablets, and intelligent phones
- Respond appropriately to equipment signals such as sound and lights

- Use hospital lab equipment which requires fine motor skills, coordination, and dexterity
- Maintain physical balance while performing examinations on patients of varying body sizes
- Standing or sitting for an extended period of time

Perfusion and Invasive Cardiovascular Technology

- Work with other health care providers in stressful or life and death situations.
- Critical thinking is sufficient for clinical judgment and decision-making.
- Handle multiple priorities in stressful situations.
- Make accurate, independent decisions.
- Concentrate and focus attention for prolonged periods to attain precise testing results.
- Possess the ability to work alone and as a member of a team.
- Apply reasoning and evaluation skills necessary in the safe technical performance of cardiovascular procedures.
- Interpersonal abilities are sufficient to interact with individuals, families, and groups from various social, emotional, cultural, and intellectual backgrounds.
- Display patience, empathy, and concern for others.
- Calmly deal with fear and hostility.
- Communication abilities are sufficient for interaction with others in verbal and written form. Communicate needs in a prompt, clear, and concise manner.
- Accurately document pertinent information.
- Follow verbal and or written instructions.
- Interact with patients and other healthcare providers in a professional manner.
- Possess physical abilities sufficient to move independently from room to room and through hallways; ability to maneuver in small places.
- Respond promptly to patients' needs.
- Manipulate equipment, lift a minimum of 30 lbs., exert a sustained force of 20lbs, push and pull mobile equipment weighing up to 300lbs.
- Participate as a team member of four in moving a 100-300 lbs. incapacitated patient.
- Stand for prolonged periods (sometimes wearing 12-20 lbs. lead apron underneath gown).
- Walk the equivalent of 5 miles per day and sit for 1 hour.
- Possess gross and fine motor skills to safely and effectively perform cardiovascular technology skills.
- Ability to grasp, hold, grip, seize, turn, or otherwise manipulate work with hands.
- Work with fingers to manipulate switches, dials, and other computer equipment.
- Input data into a computer.
- Auditory ability is sufficient to monitor and assess health needs.
- Communicate verbally with patients and other healthcare providers.
- Detect and evaluate the sounds of cardiac monitors, stethoscopes, IV pumps, fire alarms, etc.
- Visual and physical ability is sufficient to observe and monitor patients.
- Perceive attributes of an object via touch (Palpate).

Student Work Policy

Students <u>are not</u> to be substituted for regular clinical staff. Students may not take either the responsibility or the place of qualified staff. Students may be employed in a clinical setting outside regular educational hours, provided the work does not interfere with regular academic responsibilities. The student is not to be paid during clinical time. If this occurs, the student will be terminated from the program.

Student Safety & Exposure to Blood-Borne Pathogens and Communicable Diseases

All students must follow all hospital policies and procedures regarding Universal Precautions while enrolled in the program and at clinical sites.

Professional Appearance and Ethics

As a student and representative of the Cardiovascular Institute, you will be working with the public and hospital personnel. Your appearance, professionalism and communication are critical for your success as a healthcare provider and should be kept in mind at all times.

Appearance and Personal Grooming

Dress Code: Students are considered representatives of the Cardiovascular Institute and, as such, are expected to dress accordingly. Unless directed otherwise, school-issued black scrubs with the embroidered school logo and BSWH name badge must be worn in the classroom and clinical settings at all times, along with appropriate closed-toe shoes. Otherwise, the student will be considered out of dress code and may be sent home for the day from clinic, and that clinical day must be made up.
Name Badge: Each student will receive an official Baylor Scott & White name badge which is to be worn at all times during class and clinical rotations. Your badge will be necessary for identification purposes in the hospital setting and for access to restricted areas of the hospital.
Jewelry: For hygienic and safety purposes, no rings other than engagement rings and wedding bands may be worn. In the clinical setting, low-profile silicon engagement or wedding bands must be used to avoid rupture of latex/non-latex hygienic gloves.
Hair: Hair, mustaches, and beards must be kept neat and clean. Hair, which falls below collar level, must be worn up or pulled back. If N-95 masks must be regularly worn in the clinical setting due to COVID-19 or hospital policy, men must be clean-shaven for the mask to properly seal.
Footwear: Comfortable shoes or clean sneakers must be worn. No open-ended shoes or sandals are allowed in the clinical setting but may be worn in the classroom and lab.
Tattoos/Body Art: Tattoos may be visible but should not be distracting or on the face or throat. Inappropriate tattoos should be covered.
Fingernails: Fingernails are to be kept neat and trimmed. Long fingernails or artificial nails are not permitted due to the patient's discomfort from them and the potential to transmit disease. Any nail polish that may cause a patient reaction must be taken care of at a clinical site if that site permits you to remove it.
Perfumes/Colognes/Body Odors: Since you will be working in close contact with patients that may be adversely affected by heavy scents or odors, personal hygiene and appropriate scents are extremely important. Body odors cannot be camouflaged by perfume or cologne. Bathing or showering is a daily must, as is freshly laundered clothing, and should be accompanied with an effective antiperspirant/deodorant. Similarly, heavy perfumes or colognes such as patchouli oil are prohibited.

All students must follow these policies for Appearance and Personal Grooming in the clinical, classroom and laboratory settings.

Ethics and Professionalism

Students perform under the direction of physicians and share the ethical obligations that physicians must maintain. They are to protect and to promote the best interests of the patient. Working together, students must acknowledge patient values and beliefs and avoid interfering with their expression and personal beliefs.

Confidentiality

Information concerning patients received directly or indirectly, is NEVER to be given out to other than authorized personnel in or out of the hospital or clinical site. Students are to conduct themselves both on- and off-duty in a manner which will not discredit the hospital or clinical site, program, themselves or the respective profession. Unprofessional behavior will lead to disciplinary action such as loss of a benefit day, verbal/written warnings, and suspension from the program, or termination from the program.

Sexual Harassment

Sexual harassment is a form of sexual discrimination. **The Cardiovascular Institute does not tolerate any form of sexual harassment of its employees, students, or faculty.** The Cardiovascular Institute has a procedure to respond quickly and responsibly to complaints of sexual harassment. If a student has a complaint, he or she should report it directly to the Program Director. If the immediate Program Director is the source of the harassment, the report should be made to the Program Director's supervisor. Any Program Director or faculty member who receives a report of sexual harassment must report the allegations to the Division Director of Human Resources or his/her designee. If a student does not feel comfortable in reporting sexual harassment through his/her supervisory chain of command, the report should be made directly to the Division Director of Human Resources or his/her designee. Any student determined to have engaged in harassment may be subject to discipline up to and including expulsion from the program.

School-Student Communications

The Cardiovascular Institute will communicate with prospective students, applicants, current students and graduates via Canvas LMS and email whenever possible, and US Postal mail secondarily. Email is a reliable, quick, and efficient mode of communication, and free email accounts are readily available for prospective students and applicants. Current students will be provided with an institutional email address for communications while in the program. The Cardiovascular Institute may also communicate with current students via social media and text messaging.

Student-Patient Communications

The student must consider carefully not only what to say to patients, but also how to deliver information, *if any at all*. Keeping in mind that patients often do not fully understand what is said, or they may misunderstand or take statements out of context, the student should communicate clearly and provide information that is appropriate as a student. Work toward preparing patients psychologically for their examinations by explaining the procedure and establishing realistic expectations. Keep an open line of communication with patients for this will allow the student to perform better at the highest level. Patients arrive for their test with very clear expectations of the person who will be conducting their examinations, and they respond according to the treatment they receive. For instance, some patients may refuse to submit to a procedure by a "student", simply because they perceive a student as someone who is not yet fully trained or competent. Observing the interaction of student with the student's co-workers and other health professionals also can influence a patient's perceptions of professionalism. Patients have little confidence in students who exhibit overly casual immature behavior. **Students will act professionally and remain respectful at all times.**

Patient Modesty

By observing the rules of draping and covering the patient to the greatest extent possible during an examination, the student can reduce patient anxiety. For adult echocardiography students, at the end of an examination, be sure that the patient is fully covered or completely dressed before you open the door and walk out. Before entering a room that has the door closed, be sure to knock first and wait to be allowed into the room. If the student needs assistance of feels uncomfortable with a situation the student

is to seek the guidance of a hospital staff employee. Students are expected to determine the appropriate manner in which to deal with a patient. They should communicate their interests in the patient at all times and provide assurance at the end of the examination that they have given their best services.

Disciplinary Action

Due to the variety of circumstances involved in appearance, attitude, and conduct, no one disciplinary standard can apply to all areas. The type and degree of disciplinary action will depend upon the type of infraction, and how many other previous warnings the student has received. The severity of the disciplinary action may range from being sent home and being required to make-up time, to possible termination from the program. The Program Director and the Cardiovascular Institute Administration will determine the outcome. A copy of each warning that a student receives will be of permanent record in the student's file.

Program Requirements and Clinical Expectations

Credentialing Exams

Adult Echocardiography

Students are required to sit for either the CCI or ARDMS registry exam prior to graduation. Students that do not pass the registry exam must retake the examination at the earliest time possible, as defined by CCI and ARDMS guidelines. Upon successful completion of the registry exam, the student will earn the following credential(s):

CCI Credentials:
Registered Cardiac Sonographer (RCS)

ARDMS Credentials:
Registered Diagnostic Cardiac Sonographer (RDCS-AE)

Cardiovascular Perfusion Credentials:
In addition to completing all relative coursework, students will be required to submit a minimum of 75 cases conducted as students under the direct supervision of certified and licensed clinical instructor. With the design of this program, students should expect to complete at least 100 of these cases. These cases will be a requirement for graduation as well as for eligibility to take Step 1 of the CCP exam.

Upon completion of the program, students will be able to take Step 1 of the Certified Clinical Perfusionist (CCP) credentialing exam. This is the didactic portion of the CCP exam given by the American Board of Clinical Perfusion (ABCP). Eligibility for this portion of the exam depends on both successful graduation from an accredited Perfusion program and submission of 75 student cases.

After they have graduated and obtained employment at an accredited heart surgery program within the United States, they will be required to complete 40 additional cardiac cases as a provisional Perfusionist. Upon submission of these 40 cases to the ABCP, students will be able to take Step 2 of the Certified Clinical Perfusionist (CCP) credentialing exam. This is the clinical portion of the CCP exam given by the ABCP.

Invasive Cardiovascular Technology

Students are required to sit for the CCI registry exam prior to graduation. Students that do not pass the registry exam must retake the examination at the earliest time possible, as defined by CCI registry guidelines. Upon successful completion of the registry exam, the student will earn the following credential(s):

CCI Credentials:
Registered Invasive Cardiovascular Specialist (RCIS)

Program Graduation Requirements

To successfully remain in any program and be eligible for graduation the student must:

- Complete all clinical rotations and competencies
- Complete all course requirements
- Maintain passing grade of 77% "C" or better as defined in the Grading System for each program, including clinical competency evaluations and in all classes
- Successfully pass a national registry examination (Adult Echocardiography and Invasive Cardiovascular Technology only)
- Successfully complete 75 adult and 10 pediatric cases as a student Perfusionist (Cardiovascular Perfusion only)

If a student does not receive a passing grade in the academic or clinical rotations, the student will not be able to continue in the program. At that time, the student will be dismissed from the program and will receive a letter documenting the total hours (both clinical and didactic) that the student has completed for his or her own records. Tuition refunds due the student, if any, will be paid as governed by Texas law and school policy.

Clinical Rotations

Students are required to rotate through all clinical sites designated by the school. Students are also required to attend didactic classes throughout the year. It is the program's philosophy that students will be better prepared for the workforce by the experience they gain in varied clinical rotations approved by the school. Requests for fixed or multiple clinical site experience will be considered on a case-by-case basis, but ultimately determined by the Program Director. Students who successfully complete their clinical rotation and didactic classes will be eligible for graduation.

The student should adhere to the following to succeed in his or her clinical rotations:

- Carry a small pocket notebook/tablet for recording questions and techniques pertaining to various procedures in which you observed or participated. *Ensure that you maintain patient confidentiality and keep the notebook in your control at all times.*
- Familiarize yourself with the operation and controls layout of the different pieces of equipment with which you will work. This is best done in clinic downtime when equipment is idle.
- Ask your supervisor whenever you are in doubt about a procedure or patient care technique.
- Know when and to whom to report significant patient symptoms
- Acquaint yourself with your department and how it functions: hours, duties, supplies, resources, and interdepartmental conduct
- Know about your institution's emergency, fire and disaster regulation and procedures
  Observe and participate in as many procedures performed in your assigned area
- Maintain all records as required by the Cardiovascular Institute
- Learn and develop proper professional attitude and ethics needed when working in the clinical environment
- Supply your own transportation to and from the clinical site
- Maintain high ethical and professional standards at all times
- Develop proficiency in all aspects of the clinical environment
- To successfully complete the clinical aspect of training, each student must complete the required knowledge, skills, and objectives listed in the Clinical Site Records Keeping (see below)

Clinical Site Records Keeping by Student (All Programs)

In order to meet state licensure, national accreditation requirements and to document each student experience in a variety of clinical procedures, it is imperative that each student submits complete records of the student's clinical experience. In completing these records, the student must conform to the school's standards both in terms of accuracy and completing them in a timely manner. If the records are not accurate when the Clinical Coordinator examines them, the student will face disciplinary action.

Falsification of records will result in loss of Benefit Days and/or dismissal from the program.

All Cardiovascular Institute students will utilize the Trajecsys reporting system, an on-line clinical data program, to document clinical time, procedures, and competencies specific to each program as directed by the Program Director. The student will receive training on how to use the Trajecsys system prior to beginning clinical rotations. More information can be found at: https://www.trajecsys.com/

Professional Conduct

You are entering an allied health profession and are expected to conduct yourself appropriately. Students are expected to present themselves in a professional manner at all times while in the clinical settings.

Students may be dismissed from the clinical site for any of the following reasons:

- Failure to comply with the attendance policy
- Breach of hospital confidentiality and/or HIPAA regulations
- Breach of the Code of Ethics or Technical Standards
- Critical errors deemed potentially harmful to patients
- Erratic or abnormal behavior possibly related to alcohol consumption or drug usage
- Failure to comply with hospital policies and procedures, state or federal laws
- Disrespectful or insubordinate behavior towards a clinical supervisor, faculty or any member of the healthcare team

If a clinical site dismisses a student, the student's status within the program may be in jeopardy. If a student is dismissed from the clinical site for any of the above reasons, a contact form will be filled out and the day will count as a clinical absence regardless of the time of the incident. Serious infractions or repeated incidences will be reviewed by the Program Director and the Medical Director and could result in a recommendation for dismissal from the program. The Cardiovascular Institute has the right to immediately suspend a student pending investigation of the reasons of clinical dismissal.

Personal and Professional Growth

The School and clinical faculty have identified the following areas as major elements of affective area competency:

Responsibility: In order to indicate that you take responsibility for your actions, you should engage in the following behaviors:

- Your role as a cardiovascular professional
- Your education, both clinical and didactic
- Being accountable for your actions and accepting the consequences
- Presenting a professional appearance and demeanor to patients and staff

Adaptability: In the day-to-day operation of the clinical laboratory, there are many instances where the routine must be adapted or changed to meet the patient's needs. As a Student, you should be able to:

- Recognize when change from "routine" procedure is indicated
- Successfully determine the change required for a given situation
- Accept change in a professional manner

Assertiveness: The average clinical laboratory is extremely busy. You must be able to adapt to the fast pace as well as learn from the staff. An assertive student will:

- Become an active learner, seeking ways to enhance the learning process
- Volunteer assistance rather than wait to be asked
- Be willing to accept challenge

Compassion and Empathy: As a student, and later a professional, it is vital that you treat the patient as a *person* and not a body part or exam. A compassionate professional will:

- Be aware of the patient's need for privacy, recognition, respect, and relief from pain and/or discomfort
- Respond quickly and appropriately to a patient's needs
- Be able to balance compassion and empathy with the necessity of completing the exam/procedure efficiently and accurately
- Treat all patients, staff, and fellow students equally, without regard to gender, race, religion or sexual preference

Cooperation/Teamwork: A clinical laboratory relies on the coordinated activities of all people working in the department. A Student can show cooperation by:

- Being aware when others need help
- Accepting correction or constructive criticism in a positive manner
- Finding ways to improve the accuracy of his or her performance
- Working toward being regarded as a "Team Player"

Dependability: A considerable degree of responsibility is placed on Health Care Professionals including students. It is important that the student be consistently ready and able to work. A dependable student:

- Maintains a good attendance record
- Is punctual and be motivated toward exam performance
- Performs duties and responsibilities without being reminded
- Completes all assigned tasks efficiently and on time

Diligence: Consistent attention to detail and striving for perfection are indications of diligence. A diligent student will consistently:

- Assure that paperwork is properly completed
- Strive to produce the best information possible
- Utilize different techniques

Effective Communication: Speaking and writing effectively is an essential skill for the Health Care Provider. Effective, efficient, and accurate communication when interacting with patients often determines whether an exam is successful. The Student should:

- Speak clearly and at an appropriate volume when giving instructions
- Write clearly when leaving information or instructions
- Be aware of the impact of non-verbal communication as interpreted by patients and staff

Honesty/Integrity: Clinical and classroom behavior should show evidence of these qualities. Honesty and integrity are apparent when the student:

- Will admit to not knowing something
- Will admit to making a mistake
- Takes credit only for their own work
- Treats coworkers, patients, and classmates with respect
- The Health Care Professional is expected to place the needs of patients above his or her own.

The student should:

- Maintain patient confidentiality

- Project a professional appearance and manner
- Use proper forms of address for patients and their relatives
- Treat all patients, staff, and fellow students equally
- Appropriately respond to criticism and correction
- Follow the code of ethics of the profession
- Follow the policies of the program and clinical sites to which you are assigned

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Brad J. Roberts, BS, ACS

Digitally signed by: Brad J. Roberts, BS, ACS
DN: CN = Brad J. Roberts, BS, ACS email = Brad.Roberts@BSWHealth.org C = US O = THH-P OU = Cardiovascular Insitute
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Brad J. Roberts, BS, ACS, FASE
School Director, Cardiovascular Institute