

City College of San Francisco
John Adams Center
1860 Hayes St.
San Francisco, CA 94117

Cardiovascular Technology / Echocardiography Program

Please check CVT website at ccsf.edu HCT Programs

For Fall 2020

Please contact the CVT/ECHO Program for changes or updates: lcaul@ccsf.edu

Next Starting Class will be August 2020

The program begins a new class every two years: 2020, 2022

Cardiovascular Technology / Echocardiography Technology Program (CVT/ECHO Program)

Offers courses and clinical training to learn the following skills

Cardiac Ultrasound (also known as adult echocardiography)

Cardiovascular courses include: Cardiac anatomy, cardiac ultrasound, physics of ultrasound, ECG's interpretation, stress testing, pacemaker interpretation, stress echo, cardiac pharmacology. Echo Internships are arranged with regional echocardiography departments.

The ultrasound field is a sophisticated health care field that combines technology, independent analysis, patient and professional interaction.

Program Description

- **Next starting class is August, 2020.** The CVT/ECHO Program is a two-year program.
- The CVT/ECHO Program will intake students every two years: next intake is 2020, 2020
- There is **no option** to take this program in one year or to extend it over multiple years.
- The CVT/ECHO Program is an impacted program so the number of students accepted is limited .
- **Physical expectations for clinical internships:** Students must meet employment-determined-job- description requirements. Students must be able to perform ultrasound scans (sitting or standing) for an eight hour internship shift. Student must be able to perform patient care including transferring, positioning, and assisting patients, moving ultrasound systems weighing 300-350 pounds to patient rooms, emergency departments, & critical care units. Must be able to move and adjust patient beds and patient care equipment.
- **Students must be able to provide their own transportation** to clinical assignments which are located throughout the Bay Area
- Students can complete the program with a Certificate of Completion or if all college course requirements are completed with an Associates of Science in CVT/ECHO.

Program Contact

Lisa Caul, BS, RDCS

Office: CCSF, John Adams Center, Gym Building, Room 113

lcaul@ccsf.edu Phone (415) 561-1813 Fax: (415) 561-1999

Is the CVT Program Accredited by CAAHEP

The program is **not** currently accredited by CAAHEP. At the completion of the program students will qualify to take the national registry exams. Students can complete the program with a Certificate of Completion or if all college course requirements are completed with an AS in CVT/ECHO.

Prerequisites for entering the CVT ECHO Program August 2020

This program, like all health care programs, is impacted. Twenty students out of an expected 80-100 applicants will be accepted into the CVT/ECHO Program for August 2020. PLEASE CHECK WEBSITE FOR ANY CHANGES

- 1) **College level anatomy:** Bio 106 [formerly ANAT 14] or Bio 108 [formerly ANAT 25]. A comparable anatomy course from another community college is acceptable. You need to consult with your college counselor to determine course equivalency.
 - Completion of college level anatomy (see below) with a “C” or better, completed within last 5-7 years.
 - Anatomy course must be completed by Dec 2019 to qualify for the April 2020 orientation/application date.
 - Anatomy from technical schools WILL NOT be accepted, no on-line anatomy accepted.
 - Anatomy must be a full 18 week semester length or two college quarters in length
- 2) **English pre-req:** ENGL 96 or ENGL 88 or ENGL 88B or ESL 160 or placement in ENGL 1A
- 3) **CCSF placement exam** is required for applicants without an AS/AA or BS/BA degree. It must be competed and results brought to orientation/application date.
- 3) **Any equivalency issues on courses** will require the applicant to have their course evaluated by CCSF counseling department. This must be completed by the orientation date.
- 4) **Attend one of the orientation/application meetings** in April 2020 (dates to be available in late August 2019). No appointment or reservation is required for the orientation/application meetings.
- 5) The **individual** orientation the date is determined after attendance at one of the CVT/ECHO orientation meetings.

Highly recommended courses and health care experience

- Work or volunteer experience in a health care facility (to confirm your interest in health care)
- Physiology, algebra, physics, medical terminology
- ECG course to obtain a “preview” into the course content of the CVT/ECHO Program

Steps for Applying to CVT / ECHO Program

- 1) Submit a completed CCSF application to the **college**. *College* applications available online.
- 2) **Applications to the CVT / ECHO Program will ONLY** be available at the orientation meetings on these days
- 3) **Placement tests** for CCSF are required if you do not have an Associates or Bachelor’s degree. Check with main office 415-561-1900 for this information and dates for the placement tests.
- 4) Attend a CVT/ECHO program orientation. Bring resume and college transcripts to orientation meeting
- 5) Complete the application to the CVT/ECHO Program (**available only at the orientation meeting**)

Orientation/Application Meetings for Fall 2020

- 1) **Orientation/Application dates will in in April 2020, dates to be made available in August 2019.** John Adams Center, 1860 Hayes Street, SF, CA 94117 Room location: Gym Building, Room 103
- 2) Information offered about program & employment opportunities
- 3) General counseling offered regarding college information
- 4) Appointments for individual orientation for CVT / ECHO candidates will be available at the orientation meetings

Individual Orientation Meeting

- 1) After the general orientation, qualified candidates will attend a brief individual orientation to submit application documents and review requirements for program.
- 2) Applicants will schedule the individual orientation meeting at the orientation meeting.
- 3) Bring the following items to individual orientation
 - Current resume
 - Copy of all college transcripts (originals to be required if accepted to program.)
 - Two letters of recommendation: letters are to be from a professional contact, typed and on professional letterhead. This may include professors, employers, professional contacts
 - Copies of any relevant certificates

City College of San Francisco
Two Year CVT Program
2020-2022 Overview of Courses

CVT / Echo Curriculum and Internship Experience

Total Academic Units: 68 units

Total Clinical Hours Possible: 1164 hours

Semester 1, Fall Aug-Dec 2018 18 weeks	Semester 2, Spring Jan-May 2019 18 weeks	Summer Semester	Semester 3, Fall Aug-Dec 2019 18 weeks	Semester 4, Spring Jan-May 2020 18 weeks
Echo 101 7 units Echocardiography Cardiac anatomy, physiologic findings. Echo basics: 2D views, Doppler basics: color, PW and CW	Echo 201 6 units Advanced Echo Cardiac abnormalities: 2D and Doppler findings: valvular disease, cardiomyopathies, pericardial disease, CAD, prosthesis, HTN, endocarditis. TEE basic views		Echo 301 5 units Advanced Cardiac Abnormalities Congenital abnormalities. Advanced TEE procedures from operating room	Echo 401 6 units Advanced Echo Studies Review advanced echo procedures: CRT, 3D, strain rate, intravascular. Review cases from internship
CVT 101 3 units Cardiovascular Technician Cardiac conduction system, ECG waveforms, normal rhythms, dysrhythmias, ischemia, infarction patterns, exercise stress testing techniques	CVT 201 4 units Advanced CVT Advanced ECG interpretation: BBB, pacemakers, cardiac pharmacology, stress echo		CVT 301 3 units Physics of Ultrasound Physics of ultrasound	
CVT 110 7 units Cardiovascular skills Perform ECGs, develop ultrasound scanning skills, echo system instrumentation, exercise stress testing	CVT 210 7 units Advanced Cardiovascular Skills Practice stress echoes, application of formulas & instrumentation for stenosis, regurg, other cardiac abnormalities. 8 hours/week		CVT 310 9 units Clinical Experience In Cardiac Ultrasound Placement in echocardiography Lab developing scanning skills, patient care, interpretation skills. 32hours/week	Echo 410 11 units Clinical Experience in Advanced Echo Work in echocardiography labs completing studies and reports. 32 -40 hours/week
Total units 17	Total units 17		Total units 17	Total units 17

Summary of Internship Hours

Hours to be completed in a medical center or cardiology office. The program advisor will make the internship assignments.

Semester 1 Aug-Dec 2018	Semester 2 Jan-May 2019	Summer	Semester 3 Aug-Dec 2019	Semester 4 Jan-May 2020
No hospital internship hours	8 hours / week		32 hours / week	32-40 hours/week

CVT Curriculum Description

2020-2022

First Year

First Semester (Fall)

Echo 101 Echocardiography 7 units

Cardiac anatomy and physiology. Principles of cardiac ultrasound

Standard cardiac ultrasound images: 2-D and M-Mode

Identification of images & interpretation of normal cardiac structures & function

Cardiac Doppler: PW, CW and Color Flow Doppler

CVT 101 Cardiovascular Technician 3 units

Conduction system, Interpretative skills of rhythms: supraventricular & ventricular arrhythmias, axis, ischemia. Exercise stress testing: indications, protocols, procedure techniques.

CVT 110 Cardiovascular Skills 7 units

3 hours a week: In the John Adams Campus classroom echo / ECG lab

3 hours a week: Evening practice with fellow students: California Pacific Medical Center, John Muir Medical Center (Walnut Creek), Student is expected to provide her/his own transportation to these sites.

Second Semester (Spring)

Echo 201 Advanced Echocardiography 7 units

Echo and Doppler evaluation of valvular abnormalities, cardiomyopathies, prosthesis, endocarditis, cardiac masses. Application of Doppler formulas to calculate systolic and diastolic function.

Transesophageal Echocardiography (TEE) views and Doppler findings

CVT 201 Advanced Cardiovascular Technician 4 units

Advanced ECG interpretation: myocardial infarction patterns, heart blocks, bundle branch blocks, heart block, and accessory pathway conduction abnormalities. Pacemaker technology

CVT 210 Advanced Cardiovascular Skills 7 units

Students will complete 6 hours a week of observation in the San Francisco Bay Area. Observation will be in ECG labs, exercise stress testing and echocardiography labs. The assignments will be made by the CVT Program Director. Students must be able to provide transportation to the assigned labs.

Second Year

Third Semester (Fall)

Echo 301 Advanced Cardiac Abnormalities 5 units

Cardiac embryology, congenital echocardiography, stress echocardiography, electrophysiology studies with cardiac imaging, surgical ultrasound, intracoronary ultrasound.

CVT 301 Physics of Cardiac Ultrasound 3 units

Principles of Ultrasound: components of a sound wave, pulse wave instrumentation, image storage display, color Doppler and color flow imaging, image characteristics and artifacts, ultrasound equipment quality assurance, bioeffects and safety considerations

CVT 310 Clinical Experience in Cardiac Ultrasound 9 units

Students will complete 24-32 hours week Echo internship in assigned echo labs in the SF Bay Area.

Students will be expected to provide their own transportation. Assignments will be made by the CVT /ECHO Program Advisor.

Fourth Semester (Spring)

Echo 401 Advanced Echocardiography Studies 6 units

Review clinical experiences and application of new technology: strain, CRT, dyssynchrony, 3D, TEE in the OR, carotid ultrasound, abdominal ultrasound

CVT 410 Clinical Experience in Advanced Echo 13 units

Students will complete 24-32hours/week of a clinical internship. This advanced clinical training will prepare students for employment at the completion of the program.

Internships will be assigned by the program advisor.

Clinical Assignments

Assignment locations and dates are made by the CVT/ECHO Advisor. Assignments will be made

in various hospitals and offices in the bay area. All students must comply with the assignments or risk missing a clinical rotation. Students are responsible for their own transportation. Students will comply with the hours for assignments that are designated by the clinical department (i.e. start/finish hours, lunch hours) and all hospital and departmental regulations.

Advancement in the Program

Each course must be passed with a "C or 75%" or better to continue in the program and advance into the next semester of courses. Classes cannot be repeated or postponed to future years. All courses must be passed to gain a certificate in the program. Students will not be allowed to repeat the CVT / ECHO Program.

CVT/ECHO Program Schedule

2020-2022

Subject to Change

Fall (First Semester) Aug-Dec 2020

Mon	Tues	Weds	Thurs	Friday
	9-2 lecture Echo 101		9-12 lecture CVT 101	
	Option: 12-3pm Lab at CCSF		Option: 12-3pm Lab at CCSF	
	NIGHT Lab 5-8pm at CCSF or at hospital in SF		NIGHT Lab 5-8pm at CCSF or at hospital in SF	

Spring (Second Semester) Jan-May 2021

Mon	Tues	Weds	Thurs	Friday
Open for internship	9-2 lecture Echo 201	Open for internship	9-12 lecture CVT 201	Open for internship
	Option: 12-3pm Lab at CCSF		Option: 12-3pm Lab at CCSF	
	NIGHT Lab 5-8pm at CCSF or at hospital in SF		NIGHT Lab 5-8pm at CCSF or at hospital in SF	
Clinical Internship 8 hours a week to be assigned by program advisor				

Fall (Third Semester) Aug-Dec 2021

Mon	Tues	Weds	Thurs	Friday
CLASS 9-12 CVT 301	Day Open for internship 24 hours week	Open for internship 24 hours a week	Day open for internship 24 hours week	Open for internship 24 hours a week
	Night class Echo 301 6-9p			
Option: 12-3pm One 3 hour Lab at college Mon, Tues or Weds			Option: 4 – 6pm One 3 hour Lab at college Mon, Tues or Weds	
Hospital NIGHT Lab 5-8pm student to select nights at hospital in SF				
Clinical Internship 24 hours a week	➔			

Spring (Fourth Semester) Jan-May 202

Mon	Tues	Weds	Thurs	Friday
Open for internship 32 hours/week	Open for internship 32 hours/week	Open for internship 32 hours/week	Open for internship 32 hours/week	Open for internship 32 hours/week
(CLASS) Echo 401 5-9p Lecture at CCSF or CPMC	(CLASS) CVT 310 5-9p Lecture at CCSF or CPMC			
Hospital NIGHT Lab 5-8pm 4 times a month, student to select nights at hospital in SF	Hospital NIGHT Lab 5-8pm 4 times a month, student to select nights at hospital in SF			
Clinical internships 24-32 hours/wk	➔			

CVT /ECHO Career Opportunities

Opportunities for work in the Bay Area are very good but related to the overall regional and state economy. Best options for work opportunities are located outside the city of San Francisco. Employment from the CVT /Echo Program has been greater than 90% for each graduating class.

CVT/ECHO Program Associates Degree or Certification: 2 options

- **CVT certificate:** program is a two year program. A certificate is given if all courses have been completed with a "C" of 75% or better pass in all classes.
- **AS Degree:** completion of CVT/ECHO Program and other general requirements can result in an AS degree with a CVT major.

All Applicants

All students will be notified of their acceptance status at the end of the second week of June.

Student Background Checks and Drug Testing

All students must complete a background and drug testing check within the first month of the start of the program. This is a requirement for clinical assignments. Students will incur this expense. This may have to be updated for the second year of the program if required by clinical internship site.

Medical Information

Required within one month of start of program if accepted into program and at the start of the second year

- Current CCSF physical medical form signed by physician
- TB test (or equivalent required at start of each academic year while in program and repeated when required by internship site)
- MMR: Measles, Mumps, Rubella: **titer levels of each within last 5 years**
- Hepatitis B Vaccine: **titer level required within last 5 years**
- Varicella Zoster (chicken pox) **titer level required within the last 5 years**
- CPR (may be completed at John Adams during fall semester)
- Dtap: Diphtheria / Tetanus/ Pertusis verification of **vaccination within the last 5 years**
- Flu shots required seasonally (each Fall)

Physical requirements for a student in the CVT/ECHO Program

Students will be expected to meet the physical requirements required of employment standards for cardiac sonographers: ability to transfer patients from wheelchair to bed, push and position ultrasound system

to patient rooms, move patient furniture to accommodate ultrasound system, stand or sit for cardiac to perform ultrasound scans (sitting or standing) for an eight hour educational shift.

Estimated Total Cost of Program

(Fall 2020 and all costs are subject to change)

Fee Description	Each semester Subject to change	Totals Subject to change
CCSF College Tuition Free to SF Residents (check status of this policy)	\$46/unit (17 units/semester) \$782/semester	\$3,128.00
Health Fee (mandatory for each semester)	\$ 17.00/semester	\$68.00
Fall 1st year textbooks Fall 2nd year textbook	\$300.00 \$125.00	\$425.00
Background check/drug screen This may be requested by clinical site to repeat/update	\$100.00	\$100.00 50.00 for 2 nd year
Embroidered scrub shirt	\$50.00 (top and pants)	\$50.00
Student ID	\$12.00	\$12.00
Vaccinations, TB tests, Titer levels, Flu Shot	\$150 (estimate)	\$100-200.00
TOTALS	\$1,536	\$4,033

7) Registry / Credentialing in Ultrasound

General information

There are two registering organizations for ultrasound, see below. There is no state licensing required at this time. Most hospitals require cardiac sonographers to be registered most commonly by the ARDMS. Both the ARDMS and CCI are recognized by the AMA and most insurance providers.

1. ARDMS: American Registry of Diagnostic Medical Sonography

51 Monroe Street Plaza E 1
Rockville, MD 20852-8401 800-541-9754 www.ardms.org

This organization registers all ultrasound sonographers. For echocardiography the registry is RDCS: Registered Cardiac Sonographer. At the completion of the CVT Program, students will be qualified to take the RDCS exams.

2. CCI: Cardiovascular Credentialing International

1500 Sunday Drive, Suite 102
Raleigh, NC 27607 800-326-0268 www.CCI-online.org

CCI registers all categories of invasive and noninvasive cardiology. The echocardiography exam is the RCS: Registered Cardiac Sonographer. At the completion of the CVT Program, students will be qualified to take the RCS exams

8) Echocardiography Clinical Experience / Internships Sponsored by the CVT/ECHO Program

General information: students are assigned to cardiology labs in the Bay Area. All students are assigned to multiple echo labs and are expected to provide their own transportation to these assignments. The variety of labs allows students to experience multiple types of echo labs. **Students must be able to provide their own transportation** to clinical assignments located throughout the Bay Area.

9) What are the physical requirements for a student in the CVT/ECHO Program

Students will be expected to meet the physical requirements required of the employed cardiac sonographers: ability to transfer patients from wheelchair to bed, push and position ultrasound system

to patient rooms, move patient furniture to accommodate ultrasound system, stand or sit for cardiac to perform ultrasound scans (sitting or standing) for an eight hour educational shift.

10) What are the physical requirements for a cardiac sonographer

- a. **Hospital sonographers** push ultrasound systems that weigh 350 pounds and more. Most sonographers have to move and arrange patient furniture, hospital equipment to position the ultrasound systems, and position and/or transfer patients.

Cardiology offices: usually do not require pushing equipment and moving furniture. **During clinical rotations students will be expected to meet the hospital level requirements of moving equipment, patients and furniture.**

- b. At the current time sonographers complete 7-8 cases a day (1 per hour). This requires left (or right) arm and hand strength, while the opposite hand manipulates the ultrasound computer system. Students must be able to perform these standing or sitting.
- c. Students must be able to transfer patients and position patients to obtain optimal image quality.

12) Job placement

The CVT/ECHO Program does **not provide job placement**, however CVT/ECHO students have been very successful in securing jobs in the SF Bay Area, due to the recognized caliber of the academic courses and clinical internships.

13) Salaries

Salaries vary depending if the location is a hospital or private office. Entry level will vary, the range is approximately \$40-48 hour approximately \$ 70,000/year depending on the position and location.