

# CARDIOVASCULAR TECHNOLOGY (CVTE)

## CVTE-100

### Physical Principles of Medicine I

**2 UNITS**

Prerequisite: Admission to the Cardiovascular Technology Program.

Corequisite: CVTE 101 and 102 and 103.

2.0 hours lecture

A course in the mathematics and physical principles of medicine specifically applicable to the field of Cardiovascular Technology. Designed for students enrolled in the Cardiovascular Technology Program, the course includes studies in the use of mathematic formulas and physics used to evaluate the hemodynamics of the cardiovascular system. (CSU)

## CVTE-101

### Cardiovascular Physiology I

**4 UNITS**

Prerequisite: Admission to the Cardiovascular Technology Program.

Corequisite: CVTE 100 and 102 and 103.

4.0 hours lecture

A study of the anatomy, physiology, and structural relationships of the human heart and vascular system. Designed for students enrolled in the Cardiovascular Technology program, the course will concentrate on specialized terminology, cardiac and vascular anatomy, electrocardiography, and cardiac function of the normal cardiovascular system. (CSU)

## CVTE-102

### Medical Instrumentation I

**3 UNITS**

Prerequisite: Admission to the Cardiovascular Technology Program.

Corequisite: CVTE 100 and 101 and 103.

2.0 hours lecture, 3.0 hours laboratory

An integrated course in medical electronics and instrumentation for the cardiovascular technology student. The course will emphasize the concepts of electrical safety, the clinical application of electronic instruments and devices used in cardiovascular medicine, and the characteristics, recording, and measurement of bioelectric signals. (CSU)

## CVTE-103

### Laboratory Practicum and Proficiency Testing I

**2 UNITS**

Prerequisite: Admission to the Cardiovascular Technology Program.

Corequisite: CVTE 100 and 101 and 102.

1.0 hours lecture, 3.0 hours laboratory

A practicum course designed to ensure competency in the basic skills required in the clinical practice of cardiovascular technology. Students acquire skills in the performance of indirect blood pressure measurement, ankle brachial index (ABI), patient transport, ultrasound imaging and Doppler interpretation of the heart and carotid arteries to include calculations of specified hemodynamic parameters. (CSU)

## CVTE-104

### Fundamentals of Electrocardiographic Theory and Practice I

**3 UNITS**

Prerequisite: Admission to the Telemetry/ECG Certificate Program.

Corequisite: CVTE 105.

3.0 hours lecture

This course will provide basic electrocardiographic theory to understand and interpret 12-lead electrocardiograms and perform cardiac monitoring. Basic cardiac anatomy and physiology will be covered with a focus on the cardiac conduction system. Cardiac rhythm analysis will focus on sinus rhythms and atrial and ventricular arrhythmias. The skills required of a healthcare provider will be covered including HIPAA, job safety, special pediatric situations, patient care, communication with patients and associated healthcare personnel, and medical terminology. This course, CVTE 105, CVTE 106, and CVTE 108 are designed to prepare the student for any of several national ECG/EKG or Telemetry Tech certification exams. (CSU)

## CVTE-105

### Fundamentals of Electrocardiographic Theory and Practice Lab I

**2 UNITS**

Corequisite: CVTE 104.

6.0 hours laboratory

A course in the practical standard, right-sided, posterior, and pediatric 12-lead electrocardiograms. The skills required of a healthcare provider to perform non-invasive blood pressure measurement, cardiac stress testing, and the use of personal protective equipment will be covered. Students will perform these skills in an on-campus laboratory setting and be assigned to lab rotations in local clinical facilities for a portion of the semester. This course, CVTE 104, CVTE 106, and CVTE 108 are designed to prepare the student for any of several national ECG/EKG or Telemetry Tech certification exams. (CSU)

## CVTE-106

### Fundamentals of Electrocardiographic Theory and Practice II

**5 UNITS**

Prerequisite: "C" grade or higher in CVTE 104 and 105.

Corequisite: CVTE 108

4.0 hours lecture, 3.0 hours laboratory

This course will provide advanced electrocardiographic theory to understand and interpret electrocardiograms and perform cardiac monitoring. Advanced topics in ECG will include junctional rhythms, cardiac conduction blocks, cardiac pacemakers and associated rhythms, and special situations. Introduction of the cardiac action potential and pharmacological effects on heart rhythms. This course will provide the skills to admit patients to telemetry and the care of telemetry equipment and will include clinical assignment in a local telemetry unit. This course, CVTE 104, CVTE 105, and CVTE 108 are designed to prepare the student for any of several national ECG/EKG or Telemetry Tech certification exams. (CSU)

## CVTE-107

### Introduction to Clinical Practicum I

**0.5 UNITS**

Corequisite: CVTE 100 and 101 and 102 and 103.

0.25 hours lecture, 0.75 hours laboratory

A course to introduce the first year/fall semester CVTE student, enrolled in the CVTE Program, to Invasive Cardiology, Adult Echocardiography and Vascular Technology in the hospital/clinical environment. The course is designed to acquaint and educate the student with the day-to-day procedures and specific job requirements and descriptions for each track specialty. This course will provide the needed information and clinical observations to enable them in selecting a subspecialty within the field of Cardiovascular Technology. (CSU)

**CVTE-108****ECG/Telemetry Technician Career Preparation 2 UNITS**

Corequisite: CVTE 106

2.0 hours lecture

This course will prepare the ECG/Telemetry student for employment as an allied health professional in the role of the ECG technician and the telemetry technician. Utilizing classroom simulation and the learned clinical experience in ECG and Telemetry units throughout the certificate program, combined with basic job seeking skills, the ECG/Telemetry student will be prepared to seek employment as an allied health professional. Preparation for national credential exams such as but not limited to Cardiovascular Credentialing International Certified Cardiographic Technician (CCT) exam and the Certified Rhythm Analysis Technician (CRAT) exam.(CSU)

**CVTE-109****X-Ray Physics and Radiation Safety 3 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

3.0 hours lecture

A course providing advanced study in medical electronics and instrumentation which focuses on imaging technologies, utilized in invasive cardiology. Emphasis will be placed upon radiation safety, fluoroscopic regulations, fluoroscopy techniques, the x-ray imaging chain, x-ray physics, cardiovascular angiographic projections, coronary angiographic techniques, optical principles, intravascular ultrasound and Doppler techniques. Additional emphasis is placed on fluoroscopic data collection, analysis and interpretation of clinical patterns. (CSU)

**CVTE-110****Physical Principles of Medicine II 3 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

3.0 hours lecture

This course is a continuation of Cardiovascular Technology 100 with emphasis on the physical characteristics of sound, ultrasound, and Doppler ultrasound as utilized in medical diagnostic testing. The course explores the physics involved in the formation, propagation, and reflection of sound and ultrasound, the characteristics of the various types of transducers used in echocardiography and vascular duplex scanning, and the mathematical techniques employed in the use of ultrasound to measure and calculate hemodynamic function indices. (CSU)

**CVTE-111****Cardiovascular Physiology II 4 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

4.0 hours lecture

This course is a continuation of Cardiovascular Technology 101, Cardiovascular Physiology I, with emphasis on cardiovascular disease including arrhythmias, coronary artery disease, peripheral vascular disease, cardiomyopathies, heart failure and hypertension. Congenital heart disease will be introduced beginning with a study of the embryologic development of the heart. (CSU)

**CVTE-113****Introduction to Clinical Practicum II 1 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

1.0 hours lecture

This course prepares the Cardiovascular Technology student for the clinical setting with topics such as the Health Insurance Portability and Accountability Act (HIPAA), Infection Control, Radiation Safety, patient transport, basic patient care, professionalism in the healthcare setting and expectations of the Cardiovascular Technology student during clinical assignments. (CSU)

**CVTE-114****Cardiovascular Pharmacology 2 UNITS**

Prerequisite: "C" grade or higher in CVTE 111.

2.0 hours lecture

This course introduces medications used in the field of cardiovascular healthcare. Emphasis will be on the mechanism of the different types of medications and their use in the care of the cardiovascular patient. Concepts of drug classification, pharmacokinetics, and application of medications to cardiovascular disease and cardiovascular procedures will be the focus of this course.

**CVTE-115****Introduction to Adult Echocardiography 4 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

2.0 hours lecture, 6.0 hours laboratory

An introduction to Adult Echocardiography. This course is in specialized techniques and cardiovascular theory to develop cognitive and manipulative skills in the clinical operation of specified ultrasound instrumentation, and in the performance of adult echocardiography. (CSU)

**CVTE-116****Introduction to Invasive Cardiology 4 UNITS**

Prerequisite: "C" grade or higher in CVTE 100 and 101 and 102 and 103.

2.0 hours lecture, 6.0 hours laboratory

An introductory course in Invasive Cardiology with instruction in specialized techniques used in Invasive Cardiology and designed to provide lecture and laboratory practicum necessary to develop cognitive and manipulative skills in the clinical operation of specified cardiovascular instrumentation, and in the performance of diagnostic tests in cardiac catheterization procedures. (CSU)

**CVTE-117****Introduction to Vascular Technology 4 UNITS**

Prerequisite: A "C" grade or higher in all CVTE 100 and 101 and 102 and 103.

2.0 hours lecture, 6.0 hours laboratory

An introduction to vascular diagnostic sonography. This course covers specialized techniques of noninvasive testing of the human vascular system. It is designed to provide lecture and laboratory instruction in cognitive and psychomotor skills required for the clinical operation of ultrasound and other diagnostic instrumentation, as well as in the rationale, performance, and interpretation of diagnostic tests used in the vascular lab. (CSU)

**CVTE-130****Clinical Practicum I 2 UNITS**

Prerequisite: "C" grade or higher in CVTE 113.

6.0 hours laboratory

This laboratory course is the first student opportunity to perform cardiovascular diagnostic testing in a clinical setting under the guidance of an experienced Cardiovascular Technologist. Basic patient interaction, routine patient care, diagnostic testing in a clinical setting, preliminary findings and the physician's final report will be introduced. The diagnostic proficiencies learned in the classroom and practiced during the first-year lab sessions of the Cardiovascular Technology Program will be applied to situations in the hospital, clinic or doctor's office setting. (CSU)

**CVTE-220****Clinical Practicum II****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 130.

15.0 hours laboratory

The second laboratory course providing clinical practicum for students in the Cardiovascular Technology Program. Emphasis will be on the continuation of building the skills, knowledge and behaviors necessary for the successful Cardiovascular Technologist. The performance of specified diagnostic tests, calculation of hemodynamic data, and professional performance in the clinical environment will be stressed. (CSU)

**CVTE-221****Diagnostic Procedures I: Adult Echocardiography****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 115.

3.0 hours lecture, 6.0 hours laboratory

A course in specialized techniques using echocardiography for testing and evaluation of cardiovascular disease. Lectures will stress the performance and analysis of cardiac ultrasound studies, the relationship of ultrasound findings to cardiac pathology and the measurement and calculation of specified hemodynamic parameters. Special emphasis is given to incorporating the American Society of Echocardiography (ASE) Guidelines. The classroom laboratory provides advanced instruction in the topics and performance of diagnostics tests in echocardiography. The theory, operation and clinical application of specified diagnostic medical instrumentation will be applied. (CSU)

**CVTE-222****Interventional Procedures I: Invasive Cardiology****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 116.

3.0 hours lecture, 6.0 hours laboratory

This course provides advanced study in medical electronics and instrumentation, focusing on devices utilized in invasive cardiology. Specialized techniques and interpretation of physiologic data obtained during diagnostic and interventional procedures performed in the Cardiac Catheterization Lab will be emphasized. Classroom and hospital based lab sessions will focus on coronary, peripheral and electrophysiologic procedures. (CSU)

**CVTE-223****Diagnostic Procedures I: Vascular Technology****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 117.

3.0 hours lecture, 6.0 hours laboratory

A course of instruction in the specialized techniques of noninvasive testing of the human vascular system and the evaluation of vascular pathophysiology. Lectures will stress the performance and analysis of vascular ultrasound scanning, spectral analysis and the interpretation of scanning and non-scanning modalities for vascular testing. The classroom laboratory provides advanced instruction in the topics and performance of diagnostics tests in vascular technology. The theory, calibration, operation and clinical application of specified diagnostic medical instrumentation will be applied. Hospital based laboratory sessions are conducted in vascular laboratories in local hospitals, with instruction in techniques of duplex scanning of the cerebrovascular and lower-extremity vasculature. (CSU)

**CVTE-225****Extended Experience in Clinical Practicum****1 UNITS**

Prerequisite: "C" grade or higher in CVTE 220.

3.0 hours laboratory

A course designed to provide students with a continuation of their clinical experience. This course will provide continued application of invasive, noninvasive and vascular diagnostic techniques and clinical instruction. Students are assigned to local clinical facilities where they participate in the performance of cardiac catheterization procedures, echocardiography and vascular studies as determined by clinical specialty. (CSU)

**CVTE-250****Clinical Practicum III****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 220.

15.0 hours laboratory

This third laboratory course provides a continuation of clinical practicum for students in the Cardiovascular Technology Program. Emphasis will be on consolidating skills acquired in CVTE 220 and building upon those skills to advance the student toward program completion. (CSU)

**CVTE-251****Diagnostic Procedures II: Adult Echocardiography****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 221.

3.0 hours lecture, 6.0 hours laboratory

This course is a continuation of Cardiovascular Technology 221. It is an advanced course in the techniques utilized in the diagnosis and serial follow-up of cardiovascular disease using conventional imaging as well as strain, stress echo, and trans-esophageal echocardiography (TEE). Special emphasis is given to incorporating the American Society of Echocardiography (ASE) Guidelines. The classroom laboratory continues advanced instruction in the topics and performance of diagnostics tests in echocardiography. The theory, operation and clinical application of specified diagnostic medical instrumentation will be applied. (CSU)

**CVTE-252****Interventional Procedures II: Invasive Cardiology****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 222.

3.0 hours lecture, 6.0 hours laboratory

This course continues the advanced study of cardiac medical electronics and instrumentation, focusing on devices utilized in invasive cardiology. Specialized interventional procedures performed in the Cardiac Catheterization Lab will be emphasized, along with structural heart, cardiac rhythm management, device implantation, and electrophysiology studies. Classroom and hospital-based lab sessions will focus on coronary, peripheral and electrophysiologic procedures. (CSU)

**CVTE-253****Diagnostic Procedures II: Vascular Technology****5 UNITS**

Prerequisite: "C" grade or higher in CVTE 223.

3.0 hours lecture, 6.0 hours laboratory

A course of instruction in the specialized techniques of noninvasive testing of the human vascular system and the evaluation of vascular pathophysiology. Lectures will stress the performance and analysis of vascular ultrasound scanning, spectral analysis and the interpretation of scanning and non-scanning modalities for vascular testing. The classroom laboratory provides advanced instruction in the topics and performance of diagnostics tests in vascular technology. The theory, calibration, operation and clinical application of specified diagnostic medical instrumentation will be applied. Hospital based laboratory sessions are conducted in vascular laboratories in local hospitals, with instruction in techniques of duplex scanning of the cerebrovascular and lower-extremity and abdominal vasculature. (CSU)