



Course Description

SON2401C | Echocardiography 2 | 2.00 credits

An in-depth course designed to cover all aspects of clinical cardiovascular ultrasound studies. Topics discussed are pathophysiological basis of diseases, clinical presentation and clinical data, Doppler and echocardiographic findings in disease, hemodynamic relationships, scanning pitfalls and differential diagnosis. Cardiac pathologies that will be covered are valvular pathology, ischemic heart disease, infective endocarditis, pericardial effusion, tamponade, and congestive heart failure. Prerequisite: SON1000L.

Course Competencies

Competency 1: The student will demonstrate knowledge, application, and comprehension of normal and abnormal measurements done in 2D sonography by:

1. Identify normal adult heart anatomy
2. Discuss normal cardiac circulation, hemodynamics, and physiology
3. Identify anatomy displayed on transesophageal echo images
4. List and describe the echocardiographic views performed in a standard adult echo
5. Identify the console controls used to produce and optimize the images in an adult echo

Competency 2: The student will demonstrate knowledge and comprehension of measurements done on the 2D/M mode exam by:

1. List measurements necessary and normal ranges of measurements in a 2D exam
2. Measuring walls, ventricular volumes, ejection fractions, and cardiac outputs on case presentations
3. Interpreting the cause of abnormal measurements
4. Differentiate volume and pressure overload and describe the various causes

Competency 3: The student will demonstrate knowledge and comprehension of measurements done on Doppler by:

1. Listing Doppler measurements done in normal and abnormal cases
2. List the normal ranges of measurements done on the Doppler exam
3. Interpreting the cause of abnormal measurements on Doppler
4. Performing measurements on case presentations

Competency 4: The student will demonstrate knowledge and comprehension of the mechanisms of the disease processes that affect the heart, including the cause and appearance of the following, and Discuss signs, symptoms, risk factors, and complications of cardiac disease in adults by:

1. Evaluating:
 - a. Valvular disease in the adult heart. Echo evaluation and findings
 - b. Prosthetic Heart Valves: types of prosthetic heart valves and the related echo findings
 - c. Endocarditis, myocarditis & pericarditis. Discuss how infection can affect the adult heart and related echo findings in adults
 - d. Pericardial disease, pericardial effusion, and Tamponade: how to evaluate and related echo findings in an adult
 - e. Coronary Artery Disease and related findings on an echo
 - f. Cardiomyopathies: differentiate the types of cardiomyopathies and describe the related echo findings in adults
 - g. Cardiac Myxomas, Tumors, Masses, Thrombus, and Missiles
 - h. Heart Failure
 - i. Diseases of the aorta, aortic arch/thoracic aorta and related echo findings in an adult
 - j. Congenital Heart Disease (Septal defects, PDA, Endocardial Cushion Defects, PS, Coarctation of the Aorta, Ebstein Anomaly, Tetralogy of Fallot, TGA, HLHS)
 - k. Cardiac Trauma. Valvular disease in the adult heart

- l. Cardiac Trauma
- m. Echo evaluation and findings. Prosthetic Heart Valves: types of prosthetic heart valves and the related echo findings
- n. Endocarditis, myocarditis & pericarditis. Discuss how infection can affect the adult heart and related echo findings in adults
- o. Pericardial disease, pericardial effusion and Tamponade: how to evaluate and related echo findings in an adult
- p. Coronary Artery Disease and related findings on an echo
- q. Cardiomyopathies: differentiate the types of cardiomyopathies and describe the related echo findings in adults
- r. Cardiac Myxomas, Tumors, Masses, Thrombus, and Missiles
- s. Heart Failure
- t. Diseases of the aorta, aortic arch/thoracic aorta and related echo findings in an adult.
- u. Congenital Heart Disease
- v. (Septal defects, PDA, Endocardial Cushion Defects, PS, Coarctation of the Aorta, Ebstein Anomaly, Tetralogy of Fallot, TGA, HLHS)

Competency 5: The student will demonstrate knowledge and comprehension of congenital heart disease by:

- 2. Discussing embryology and the development of the heart
- 3. List and describe congenital heart defects identified in adults
- 4. Describing fetal circulation and the changes that occur at birth
- 5. Defining and identifying congenital anomalies such as PDA, ASD, VSD, PS, Coarctation of the Aorta, Ebstein's anomaly, Tetralogy of Fallot, TGA, HLHS, etc.
- 6. Describing 2D Mode and Doppler findings for each anomaly
- 7. Discuss surgical repairs for each anomaly

Competency 6: The student will demonstrate knowledge and comprehension of cardiac surgical procedures and invasive procedures by:

- 1. List and describe alternative imaging techniques used to evaluate the heart
- 2. Listing types of valvular replacements
- 3. Describing pericardiocentesis. Ultrasound-guided procedures (i.e., TEE, intracardiac echo)
- 4. d. Listing and defining the types of invasive procedures and their purpose
- 5. Defining the types of cardiac surgical procedures (i.e., CABG, TAVR)

Learning Outcomes:

- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively