

LAST REVIEW: 2010-2011 **NEXT REVIEW:** 2015-2016 **STATUS:** A
(A, I, D)

COURSE TITLE: Echocardiography II

COMMON COURSE NUMBER: SON2401

CREDIT HOURS: 2

CONTACT HOUR BREAKDOWN
(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: 32 **Lab:**
Clinic: **Other:**

PREREQUISITE(S): SON2400, SON2834

COREQUISITE(S): SON2161, SON2844

PRE/COREQUISITE(S):

COURSE DESCRIPTION (750 characters maximum): **An in-depth presentation of the intricacies of diagnostic ultrasound as it applies to the heart and the chest stressing its capabilities and its limitations.**

General Education Requirements – Associate of Arts Degree (AA), meets Area(s): Area
General Education Requirements – Associate in Science Degree (AS), meets Area(s): Area
General Education Requirements – Associate in Applied Science Degree (AAS), meets Area(s): Area

UNIT TITLES

1. General
2. Vascular Disease
3. Diseases of the Heart Muscle
4. Endocarditis
5. Cardiac Tumors and Thrombi
6. Pericardial Disease
7. Hereditary and Congenital Cardiovascular Anomalies
8. Prosthetic Valves

ASSESSMENT:

Please provide a brief description (250 characters maximum) that details how students will be assessed on the course outcomes.

Quizzes, Midterm and Final Exam – all comprehensive. Attendance is required for successful completion

UNITS

Unit 1 General

General Outcome:

- 1.0 The student shall:** describe the normal heart and changes due to common pathologies using technical terminology.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1** Recall knowledge gained in Term I regarding anatomy, physiology, embryology, terminology, pharmacology, and imaging of the heart.
- 1.2** Discuss common pathology found in the cardiovascular system.
- 1.3** Describe normal and abnormal cardiac and circulatory physiology and pathophysiology.
- 1.4** Demonstrate knowledge of clinical medicine as it relates to cardiac sonography.
- 1.5** Demonstrate knowledge and understanding of the relationships of cardiac procedures.
- 1.6** Demonstrate knowledge and understanding of related imaging, laboratory and testing procedures as they contribute to the clinical evaluation of disease and pathology.
- 1.7** Integrate patient history and physical findings to determine appropriate area(s) of interest and plane(s) of scans for obtaining diagnostic examinations.
- 1.8** Explain changes in hemodynamics associated with specific pathologies.
- 1.9** Demonstrate knowledge of normal and abnormal cardiac and circulatory physiology and pathophysiology, congenital and acquired.

UNITS

Unit 2 Valvular Diseases

General Outcome:

- 2.0 The student shall:** explain the normal physiology of the cardiac valves and the changes due to valvular pathology, the pathologic processes of the valves, and proper demonstration of valvular disease.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1 Describe the pathophysiology of rheumatic heart disease.
- 2.2 Explain the complications of rheumatic heart disease.
- 2.3 Define mitral stenosis and mitral insufficiency.
- 2.4 Describe the pathophysiology of mitral stenosis and mitral insufficiency.
- 2.5 Identify the echocardiographic findings of mitral stenosis and mitral insufficiency.
- 2.6 Describe the echocardiographic techniques involved with the examination of mitral stenosis and mitral insufficiency.
- 2.7 Define aortic stenosis and aortic insufficiency.
- 2.8 Outline the pathophysiology of aortic stenosis and aortic insufficiency.
- 2.9 Identify echocardiographic findings of aortic stenosis and aortic insufficiency: 2D, M-mode, pulse wave, continuous wave, and color flow Doppler.
- 2.10 Describe the echocardiographic techniques involved with the examination of aortic stenosis and aortic insufficiency: 2D, M-mode, pulse wave, continuous wave, and color flow Doppler.
- 2.11 Outline the pathophysiology, complications and echocardiographic findings involved with tricuspid stenosis and tricuspid insufficiency.
- 2.12 Outline the pathophysiology, complications and echocardiographic findings involved with pulmonary stenosis and pulmonary insufficiency.
- 2.13 Describe mitral valve prolapse.
- 2.14 Identify echocardiographic findings of mitral valve prolapse.

- 2.15 Describe flail leaflet.
- 2.16 Identify echocardiographic findings of flail leaflet.
- 2.17 Describe calcified mitral annulus.
- 2.18 Identify echocardiographic findings of calcified mitral annulus.
- 2.19 Define Marfan's syndrome.
- 2.20 Identify the normal echocardiographic: 2D, M-mode, pulse wave and continuous wave Doppler appearance of the valves.
- 2.21 Recognize abnormal echocardiographic appearance of the valves and list the possible differential diagnosis for the abnormality seen.
- 2.22 Identify normal color flow Doppler pattern of the valves.
- 2.23 Recognize abnormal color flow Doppler pattern of the valves and list the possible differential diagnosis for the abnormality seen.

UNITS

Unit 3 Diseases of the Heart Muscle

General Outcome:

3.0 The student shall: explain the pathophysiology of diseases of the heart muscle, and identify same on echocardiographic examinations.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1 Define ischemic heart disease.
- 3.2 Outline the complications of atherosclerosis.
- 3.3 Explain the pathophysiology of ischemic heart disease.
- 3.4 List the complications of ischemic heart disease.
- 3.5 Define hypokinesis, hyperkinesis, dyskinesis, and akinesis.
- 3.6 Describe compensation of wall motion and thickening.
- 3.7 Describe the echocardiographic findings of ischemic heart disease:
 - a. Primary echocardiographic findings.
 - b. Secondary echocardiographic findings.
- 3.8 Explain the echocardiographic techniques for the demonstration of ischemic heart disease.
- 3.9 Describe other techniques employed in conjunction with echocardiographic techniques for the assessment of ischemic heart disease.
- 3.10 Recall the types of cardiomyopathies.
- 3.11 List the causes of each type of cardiomyopathy.
- 3.12 Describe the primary and secondary findings in cardiomyopathy.
- 3.13 Outline the clinical findings in cardiomyopathy.
- 3.14 Define SAM.
- 3.15 Identify the echocardiographic appearance of cardiomyopathy.

- 3.16** Demonstrate understanding of the hemodynamic changes associated with diseases of the heart muscle.
- 3.17** Describe the methods used for stress echocardiography..
- 3.18** List information obtainable from stress echocardiography relative to left ventricular function.

UNITS

Unit 4 Endocarditis

General Outcome:

- 4.0 The student shall:** explain the pathophysiology of bacterial and vegetative endocarditis, and identify same on echocardiographic examinations.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1** Describe the pathophysiology of bacterial endocarditis.
- 4.2** Outline the clinical features of endocarditis.
- 4.3** Describe the echocardiographic manifestations of vegetative endocarditis.
- 4.4** Recall other techniques used in conjunction with echocardiography to assess endocarditis.
- 4.5** Identify the echocardiographic appearance of vegetative endocarditis.

UNITS

Unit 5 Cardiac Tumors and Thrombi

General Outcome:

5.0 The student shall: explain the pathophysiology of, and echocardiographic demonstration of cardiac tumors and thrombi.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1** Describe primary cardiac tumors.
- 5.2** List the clinical features of cardiac tumors.
- 5.3** Identify a cardiac mass on echocardiographic examination.
- 5.4** Recall methods to distinguish between atrial myxoma and mitral stenosis on M-mode.
- 5.5** Explain the formation of thrombi and emboli and list predisposing factors.
- 5.6** Describe the echocardiographic evaluation of thrombi and emboli.
- 5.7** Identify patterns in the color flow Doppler image associated with tumor and/or thrombus.

UNITS

Unit 6 Pericardial Disease

General Outcome:

6.0 The student shall: explain the pathophysiology of, and describe the echocardiographic examination of pericardial disease.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1** Recall the causes of pericardial disease.
- 6.2** Describe the appearance of acute pericarditis.
- 6.3** Describe the appearance of pericardial effusion.
- 6.4** Outline the clinical findings of pericardial disease.
- 6.5** Describe the echocardiographic examination of pericardial disease.
- 6.6** Identify the echocardiographic findings of pericardial disease.
- 6.7** Describe other techniques used in conjunction with echocardiography to assess pericardial disease.
- 6.8** Demonstrate knowledge and understanding of the invasive procedures employed in conjunction with pericardial disease, such as assisting for fluid localization during pericardiocentesis.

UNITS

Unit 7 Hereditary and Congenital Cardiovascular Anomalies

General Outcome:

7.0 The student shall: explain and describe hereditary and congenital cardiovascular anomalies and their echocardiographic demonstration.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1 Define Barlow's syndrome.
- 7.2 Define idiopathic hypertrophic subaortic stenosis.
- 7.3 Describe the pathophysiology of idiopathic hypertrophic subaortic stenosis.
- 7.4 Identify the echocardiographic manifestations of idiopathic hypertrophic subaortic stenosis.
- 7.5 Describe the echocardiographic techniques employed to demonstrate idiopathic hypertrophic subaortic stenosis
- 7.6 Define the various types of atrial septal defects.
- 7.7 Outline the clinical manifestations of atrial septal defects.
- 7.8 Describe the echocardiographic techniques employed to demonstrate atrial septal defects.
- 7.9 Recall other techniques used in conjunction with echocardiography for the evaluation of atrial septal defects, including Doppler techniques.
- 7.10 Define Tetralogy of Fallot.
- 7.11 Recall the types of Tetralogy of Fallot.
- 7.12 Explain the pathophysiology of Tetralogy of Fallot.
- 7.13 Outline the clinical course of Tetralogy of Fallot.
- 7.14 Describe the echocardiographic manifestation of Tetralogy of Fallot.
- 7.15 Describe the echocardiographic manifestations of Tetralogy of Fallot.

- 7.16 Define truncus arteriosus.
- 7.17 Explain the pathophysiology of truncus arteriosus
- 7.18 Describe the echocardiographic manifestations of truncus arteriosus.
- 7.19 Describe the echocardiographic techniques employed to demonstrate truncus arteriosus.
- 7.20 Explain transposition of the great vessels.
- 7.21 Describe the echocardiographic manifestations of transposition of the great vessels.
- 7.22 Describe corrected transposition of the great vessels.
- 7.23 Describe the echocardiographic manifestations of corrected transposition of the great vessels.
- 7.24 Define Ebstein's anomaly.
- 7.25 Explain the pathophysiology of Ebstein's anomaly.
- 7.26 Describe the echocardiographic manifestations of Ebstein's anomaly.
- 7.27 Describe the echocardiographic techniques employed to demonstrate Ebstein's anomaly.
- 7.28 Explain the pathophysiology of congenital aortic stenosis.
- 7.29 Describe the echocardiographic manifestations of congenital aortic stenosis.
- 7.30 Describe the echocardiographic techniques employed to demonstrate congenital aortic stenosis.
- 7.31 Explain the pathophysiology of discrete subvalvular membranous aortic stenosis.
- 7.32 Describe the echocardiographic manifestations of subvalvular membranous aortic stenosis.
- 7.33 Describe the echocardiographic techniques employed to demonstrate subvalvular membranous aortic stenosis.
- 7.34 Explain the pathophysiology of congenital aneurysm of the sinuses of Valsalva.
- 7.35 Describe the echocardiographic manifestations of congenital aneurysm of the sinuses of Valsalva.
- 7.36 Define Eisenmenger's syndrome.

- 7.37 Describe the echocardiographic manifestations of Eisenmenger's syndrome.
- 7.38 Describe the various types of ventricular septal defects.
- 7.39 Explain the pathophysiology of various types of ventricular septal defects.
- 7.40 Describe the echocardiographic manifestations of the various types of ventricular septal defects.
- 7.41 Describe the echocardiographic techniques employed to demonstrate the various types of ventricular septal defects.
- 7.42 Identify abnormal color flow Doppler patterns associated with structural anomalies.
- 7.43 Explain the hemodynamic changes associated with the various structural anomalies.
- 7.44 Demonstrate knowledge and understanding of contrast echocardiography, when to use it, how to use it, and what it demonstrates

UNITS

Unit 8 Prosthetic Valves

General Outcome:

8.0 The student shall: identify various basic types of prosthetic valves when normal and abnormal and explain the echocardiographic evaluation of prosthetic valves.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1** List the basic types of prosthetic valves.
- 8.2** Describe the echocardiographic evaluation of prosthetic valves.
- 8.3** Explain abnormal changes which can occur in prosthetic valves.
- 8.4** Explain the role of color flow and spectral Doppler in the evaluation of prosthetic valves.

UNITS

Unit 9 Transesophageal Echocardiography

General Outcome:

9.0 The student shall: identify structures on echocardiography from the transesophageal approach and explain the procedure.

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1** Recognize and identify normal and abnormal structures and hemodynamics using the transesophageal approach.
- 9.2** List circumstances when transesophageal echocardiography can be used to evaluate the cardiovascular system.
- 9.3** Describe the technique employed to perform transesophageal echocardiography procedures and to properly care for the special equipment required.