Adult Echocardiography Examination Content Outline

(Outline Summary)

#	Domain	Subdomain	Percentage
1	**Anatomy and Physiology**	• Normal Anatomy • Normal Physiology	**15%**
2	**Pathology**	• Abnormal Physiology and Perfusion • Postoperative Evaluation	**40%**
3	**Clinical Care and Safety**	• Clinical Care • Safety	**11%**
4	**Measurement Techniques, Maneuvers, and Sonographic Views**	• Measurement Techniques • Maneuvers • Sonographic Imaging Views	**25%**
5	**Instrumentation, Optimization, and Contrast**	• Instrumentation and Optimization • Contrast	**9%**

(Detailed Outline)

1	Anatomy and Physiology 15%
1.A	**Normal anatomy**
1.A.1	Assess great vessels (aorta, pulmonary arteries, etc.)
1.A.2	Assess cardiac anatomy and normal variants (e.g., chambers, false tendon, eustachian valve, Chiari network, etc.)
1.A.3	Assess pericardium
1.A.4	Assess valve structure
1.A.5	Assess vessels of arterial and venous return (e.g., venae cavae, hepatic veins, coronary sinus, pulmonary veins, etc.)
1.A.6	Assess wall segments (structure, nomenclature, etc.)
1.B	**Normal physiology**
1.B.1	Assess normal response to stress testing (e.g., blood pressure, wall augmentation, pharmacologic reaction, exercise type, etc.)
1.B.2	Assess normal systolic and diastolic function and left ventricular strain patterns
1.B.3	Assess normal valve function (e.g., gradient, pressure half-time, acceleration time, trivial regurgitation, etc.)
1.B.4	Identify phases of the cardiac cycle

2	Pathology 40%
2.A	**Abnormal physiology and perfusion**
2.A.1	Assess aortic and sinus of Valsalva abnormalities (e.g., aneurysm, dissection, prior repair, intramural hematoma, etc.)
2.A.2	Assess arrhythmias and conduction disturbances (e.g., electrocardiography [EKG] changes, flutter, fibrillation, ventricular tachycardia, etc.)
2.A.3	Assess cardiac masses (e.g., thrombi, tumors, etc.)
2.A.4	Assess abnormal diastolic function (e.g., grades, associated abnormalities, hemodynamics, etc.)
2.A.5	Assess endocarditis (e.g., complications, vegetations, associated findings, etc.)
2.A.6	Assess ischemic cardiac diseases (e.g., mechanical complications of myocardial infarction, etc.)
2.A.7	Assess abnormal left ventricle (e.g., true aneurysms, pseudoaneurysms, left ventricular hypertrophy, hyperkinesis, etc.)
2.A.8	Assess cardiomyopathies (e.g., dilated, hypertrophic, restrictive, etc.)
2.A.9	Assess segmental wall motion abnormalities (e.g., corresponding coronary arteries, abnormal rest and stress, etc.)
2.A.10	Assess abnormal left ventricle using strain (e.g., patterns, values, etc.)
2.A.11	Identify and assess abnormal systolic function
2.A.12	Assess aortic valve pathology (e.g., regurgitation, stenosis, valvular structure, etc.)
2.A.13	Assess mitral valve pathology (e.g., regurgitation, stenosis, valvular structure, etc.)
2.A.14	Assess pulmonic valve pathology (e.g., regurgitation, stenosis, valvular structure, etc.)
2.A.15	Assess tricuspid valve pathology (e.g., regurgitation, stenosis, valvular structure, etc.)
2.A.16	Assess pericardial disease (e.g., effusion, constrictive, restrictive, etc.)
2.A.17	Assess abnormal pulmonary artery (e.g., clot, dilatation, catheter, changes due to pulmonary hypertension, etc.)
2.A.18	Assess abnormal right ventricle (e.g., pulmonary hypertension, pulmonary embolism, etc.)
2.A.19	Assess abnormal arterial and venous return (e.g., venae cavae, hepatic veins, coronary sinus, pulmonary veins, etc.)
2.A.20	Assess abnormal structure and function of atria (e.g., volume, etc.)
2.A.21	Assess septal defects (e.g., patent foramen ovale, atrial and ventricular septal defects, etc.)
2.A.22	Identify and evaluate congenital heart defects (e.g., Ebstein anomaly, patent ductus arteriosus, tetralogy of Fallot, aortic coarctation, endocardial cushion defect, etc.)
2.A.23	Identify and evaluate connective tissue disorders (e.g., Marfan, Ehlers-Danlos, etc.)
2.B	**Postoperative evaluation**
2.B.1	Assess valve repair or replacement (e.g., normal and abnormal prosthetic valves, surgical or transcatheter valve procedures, etc.)

2.B.2	Identify and evaluate intracardiac devices (e.g., closure devices, assist devices, pacemakers, etc.)
2.B.3	Identify and evaluate post-surgical procedures for congenital heart diseases
3	**Clinical Care and Safety 11%**
3.A	**Clinical care**
3.A.1	Evaluate patient history and incorporate outside data (e.g., clinical assessment, physical history, other imaging modalities, etc.)
3.A.2	Prepare and monitor patient (e.g., positioning, EKG signal, blood pressure, fasting state, heart rate, etc.)
3.A.3	Identify and communicate critical findings
3.A.4	Practice universal precautions
3.A.5	Practice proper equipment cleaning and maintenance
3.B	**Safety**
3.B.1	Identify relative and absolute contraindications for echocardiographic procedures
3.B.2	Identify and manage medical emergencies
4	**Measurement Techniques, Maneuvers, and Sonographic Views 25%**
4.A	**Measurement techniques and Maneuvers**
4.A.1	Measure aortic valve (e.g., M-mode, planimetry, Doppler, left ventricular outflow tract measurement, etc.)
4.A.2	Measure mitral valve (e.g., M-mode, planimetry, Doppler, etc.)
4.A.3	Measure pulmonic valve (e.g., 2-D, Doppler, etc.)
4.A.4	Measure tricuspid valve (e.g., 2-D, Doppler, etc.)
4.A.5	Measure parameters of diastolic function
4.A.6	Measure great vessels and veins (e.g., dimensions, Doppler, etc.)
4.A.7	Measure atria (e.g., 2-D, M-mode, Doppler, etc.)
4.A.8	Measure left ventricle (e.g., 2-D, 3-D, M-mode, Doppler, etc.)
4.A.9	Measure pulmonary artery pressure
4.A.10	Measure right ventricle (e.g., 2-D, M-mode, Doppler, etc.)
4.A.11	Measure shunt ratios
4.A.12	Evaluate response to provocative maneuvers (e.g., Valsalva, cough, sniff, squat, etc.)
4.B	**Sonographic imaging views**
4.B.1	Obtain and optimize apical views

4.B.2	Obtain and optimize parasternal views (right and left)
4.B.3	Obtain and optimize subcostal views
4.B.4	Obtain and optimize suprasternal notch views
4.B.5	Obtain and optimize 2-D and 3-D transesophageal echocardiogram (TEE) images for valve assessment
5	**Instrumentation, Optimization, and Contrast 9%**
5.A	**Instrumentation and optimization**
5.A.1	Recognize imaging artifacts (e.g., 2-D, Doppler, etc.)
5.A.2	Utilize non-imaging transducer
5.A.3	Adjust console settings to achieve optimal Doppler recording
5.A.4	Adjust console settings to achieve optimal imaging display, including harmonics
5.A.5	Recognize critical findings and pathology on transesophageal echocardiogram (TEE)
5.B	**Contrast**
5.B.1	Utilize ultrasound enhancing agents (e.g., saline, contrast, etc.)

| **Knowledge, Skills, and Abilities:** |
| *The following is a list of the foundational knowledge, skills, and abilities required to complete the tasks listed in the content outline.* |
| Ability to recognize and assess normal cardiac anatomy, variances, and function |
| Ability to recognize and assess abnormal cardiac structure and function |
| Ability to assess the great vessels and identify abnormalities |
| Ability to identify and assess normal and abnormal valvular structure and function |
| Knowledge of distinguishing features of various cardiomyopathies |
| Knowledge of electrophysiology and components of the cardiac cycle |
| Ability to recognize normal and abnormal responses to stress testing |
| Knowledge of characteristics of various congenital heart diseases and associated surgical repairs |
| Ability to recognize and evaluate postoperative anatomy and intracardiac devices |
| Ability to safely perform echocardiographic procedures and follow current protocols |
| Knowledge of how to obtain and evaluate cardiac measurements |
| Ability to obtain appropriate echocardiographic views |
| Ability to obtain and recognize transesophageal echocardiogram (TEE) images |
| Ability to manipulate ultrasound system settings and transducers to obtain diagnostic information |
| Ability to recognize critical findings and communicate findings to the physician |
| Knowledge of indications, contraindications, and proper use of ultrasound enhancing agents |