

ECHOCARDIOGRAPHY (ECH)

ECH 100 Clinical Practicum I 1 credit

This course is provided as an opportunity for the student to perform portions of the echo exam, positions, transducer placement and terminology in the clinical setting alongside a clinical instructor. The student will apply the skills learned in Foundations of Echo scan lab in the clinical setting. This opportunity will provide the student clinical environment observation, clinical application of echocardiography and interaction with sonographers, nurses and physicians within the echo lab. (Prerequisites: BIO115, PHY112, MAT165, ENG120, and DMS100; Co-requisites: ECH110, ECH115, and BIO350).

ECH 105 Ultrasound Physics 4 credits

This course establishes the foundation for the understanding of physics of sonography and its impact on interpreting data as well as ultrasound physics principles, hemodynamics, bioeffects, and quality assurance. (Prerequisites: ECH110, ECH115, ECH100, and BIO350; Co-requisites: ECH155 and ECH150).

ECH 110 Foundations of Echocardiography 4 credits

This course will cover the history of echocardiography and where/ how it plays a role in the hospital and clinic setting. They will learn about the echo machines and their different make/models. This course will provide an understanding of the machine instrumentation, the different make/ models and the different knobs along with their functionality. Recognition of cardiac anatomy on an echocardiogram and identifying proper 2-D, M-Mode and Doppler techniques and assessment of systolic and diastolic function. This course will cover; maintaining infection control and utilizing standard precautions. Demonstrating age related competencies (ie; adults, pediatric and obstetric patients). Demonstrating appropriate techniques in intensive care environments (ancillary equipment, central venous lines, ET tubes, respiratory ventilators, etc.). Identifying life threatening situations and implementing emergency care as permitted; Emergency conditions and procedures, first aid and resuscitation techniques). Proper patient positions and transferring. Professionalism and communication skills within a health care setting. An introduction to basic cardiac medications. Overview of Allina's Commitment to Care. The student gains experience through participation in scanning labs. (Prerequisites: BIO115, PHY112, MAT165, ENG120, and DMS100; Co-requisites: ECH115, ECH100, and BIO350).

ECH 115 Cardiovascular Anatomy & Physiology 3 credits

This course will provide an understanding of the embryologic and fetal cardiac development, cardiac chambers, valve anatomy and dynamics, coronary artery anatomy and the relationship of the chambers and the great vessels. They will learn the hemodynamics of the cardiovascular system, ventricular function, pre load and after load conditions and understanding how the conduction system affects the chambers and their function. Students will be able to demonstrate knowledge of normal and abnormal cardiac anatomy and physiology. (Prerequisites: BIO115, PHY112, MAT165, ENG120, and DMS100; Co-requisites: ECH110, ECH100, and BIO350).

ECH 150 Clinical Practicum II 2 credits

The intent of this course is to provide the student with an opportunity to perform portions of an echo exam (progression from previous semesters scanning portion), review position, transducer placement, and terminology in the clinical setting. Two-dimensional (2-D) and Doppler skills learned in Foundations of Echocardiography and Adult Echo will be applied in the clinical setting. This opportunity will provide the student clinical environment observation, clinical application of echocardiography and interaction with sonographers, nurses and physicians within the echo lab. At the end of the semester the student will be able to scan a complete 2D echo within 60minutes. (Prerequisites: ECH110, ECH115, ECH100, and BIO350; Co-requisites: ECH155 and ECH105).

ECH 155 Adult Echocardiography I 5 credits

This course is provided to learn the basics of cardiomyopathies, coronary artery disease, systemic disease that affect the cardiovascular system, pericardial diseases, pulmonary hypertension, cardiac mass/ tumors and diseases of the great vessels. Students will learn 2D, M-Mode and Doppler techniques to interrogate the valvar diseases that coincide with those pathologies as well as organic valvar disease. This course will also cover the congenital abnormalities/corrections that may be seen in an adult echo lab (VSD/ASD/repairs). The student gains experience through participation in scanning labs. (Prerequisites: ECH110, ECH115, ECH100, and BIO350; Co-requisites: ECH150 and ECH105).

ECH 200 Medical Law and Ethics 3 credits

This course is designed to define the sources of law, causes of action, and litigation processes related to the professional practice of medical imaging. The interrelatedness of standards of care, law, ethical standards, and competence are examined, as are laws and regulations affecting the practitioner in employment and liability. The course is designed to establish a foundation for, and define the parameters of, professional practice. Ethical behaviors within a defined scope of practice will be discussed and examined within the context of the healthcare delivery system. (Prerequisites: Acceptance to the Diagnostic Medical Sonography Program and DMS 100).

ECH 225 Clinical Practicum III 3 credits

This course will primarily focus on development of students clinical skills for 2-Dimensional and Doppler echocardiography. Clinical Practicum III is devoted to clinical training, allowing students an opportunity to apply didactic classroom instruction and develop their clinical skills. Students will begin to integrate the clinical and echo findings and identify final impressions related to the echo exam. Observational rotations will include intraoperative TEE, Outreach echocardiography, Stress Echocardiography, TEE and contrast echocardiography. 3D and strain rate echocardiography and the role of the sonographer for each procedure will also be included in this course. (Prerequisites: ECH155, ECH150, ECH105; Co-requisites: ECH255).

ECH 250 Special Procedures 4 credits

This course will introduce other imaging modalities such as; Nuclear, CT and MRI and what information they can provide about the heart. It will focus on special procedures that involve echocardiography and the sonographers role. These procedures include; transesophageal echocardiogram, intraoperative procedures, pericardiocentesis, cardiac catheterization procedures, LVAD device interrogation and structural heart imaging. This course will also include an overview of 3D and Strain; their meaning and the sonographers role for each. (Prerequisites: ECH255, ECH225; Co-requisites: ECH275, ECH250).

ECH 255 Adult Echocardiography II 4 credits

This course will focus on case reviews and the integration of all 2-D and Doppler data. Students will be able to demonstrate application of echocardiographic data and recognize discrepancies in data, ability to identify key findings, ability to create a preliminary report, and effectively communicate the echo findings to the reviewer. (Prerequisites: ECH155, ECH150, ECH105; Co-requisites: ECH225).

ECH 275 Stress and Contrast Echocardiography 3 credits

This course will provide the student with the necessary knowledge regarding common lab values, ECG, and basic cardiac pharmacology along with a thorough understanding of the different types of stress tests performed in an echocardiographic laboratory and the technical aspects of the digitizing equipment. The role of the sonographer for each procedure will be identified. Students will develop an in-depth understanding of exercise echocardiography and the use of Dobutamine and contrast during a stress echo. At this time, students will be introduced to contrast use in special procedures class. Students will also be introduced to starting peripheral IV's. This will be combined with learning about Bubble Studies and contrast echocardiograms. (Prerequisites: ECH255, ECH225; Co-requisites: ECH275, ECH250).

ECH 280 Clinical Practicum IV 3 credits

Clinical Practicum IV will continue to develop the student's clinical skills and enhance their echocardiographic hemodynamic assessment. The focus of the term will be the ability to integrate 2-D and apply echo data in an accurate patient report. Clinical Practicum IV will introduce students to transesophageal echocardiography, congenital echocardiography and to the field of stress echocardiography. (Prerequisites: ECH255, ECH225; Co-requisites: ECH275, ECH250).

ECH 290 Clinical Practicum V 5 credits

During Clinical Practicum V, the students will apply previous didactic and clinical training to complete a quality echocardiographic examination. Students will be responsible for integrating echo data, preparing preliminary echo findings and delivering the report. (Prerequisites: ECH275, ECH250; Co-requisites: None).