SONOGRAPHY (SON)

SON 1500 Communication for the Sonography Professional — 2 credits
This course is designed to help students understand the theory and develop the skills necessary for effective communication. The course explores verbal/non-verbal communication, interpersonal listening and feedback, passive and active listening, team development, and managing conflict. Offered in the College for Adults.

SON 1605 Abdomen I — 4 credits
This course is the beginning anatomy/physiology and pathology of the abdomen sequence. This course will provide the beginning student with an understanding of the anatomy and pathology of the liver, gallbladder, and biliary systems.

SON 1615 Abdominal I Lab — 1 credit
This course is an introduction to scanning the anatomy of the liver, gallbladder, pancreas and kidney. Students will gain experience through participation in scanning labs. Offered in the College for Women.

SON 1620 Cardiac Anatomy and Physiology — 4 credits
This course will provide the student with an understanding of basic embryology of the heart, fetal development, and anomalies that may present with abnormal development.
Prerequisite: BIOL 2620. Offered in the College for Women.

SON 1630 Foundations of Echocardiography — 4 credits
This course will provide the student with an understanding of identifying cardiac structures in the cardiovascular system. Emphasis is placed on understanding the basic cardiac anatomy, terminology, and hemodynamics of the heart. Students will learn basic cardiac function, heart sounds, and basic electrophysiology.
Prerequisite: BIOL 2620. Offered in the College for Women.

SON 1635 Foundations I Lab — 1 credit
This course will provide the student with an understanding of the basic cardiac ultrasound windows, proper ergonomics, and how to optimize echo images.
Prerequisite: BIOL 2620. Offered in the College for Women.

SON 1645 Foundations II Lab — 1 credit
This course complements SON 1635 by adding routine 2D and M-mode measurements that are a part of a normal exam protocol. The student continues the hands-on experience, using proper ergonomics to avoid injury and improved image optimization. By the completion of this course, the student will be able to complete a basic echocardiographic examination with 2D and M-mode modalities and the appropriate measurement for each echocardiographic view. Offered in the College for Adults.

SON 1705 Reproductive Systems in Sonography — 4 credits
In this course, the student will learn the foundational knowledge of the male and female reproductive anatomy, physiology and pathology. The student will learn identification and location of pelvic structures and surrounding landmarks commonly imaged on Ultrasound.
Corequisite: SON 1715.

SON 1715 Reproductive Systems Skills Lab — 1 credit
This course establishes the basic foundation for the imaging technique and interpretation of the female pelvis. Students will gain experience through lab participation. Offered in the College for Women.

SON 1805 Abdomen II — 4 credits
This course will provide the intermediate student with an understanding of the anatomy and pathology of the pancreas, spleen, urinary system, and abdominal vasculature. This is a continuation of the skills and knowledge acquired in Abdominal I (SON 1605).
Prerequisite: SON 1605.
Corequisite: SON 1815.

SON 1815 Abdominal II Lab — 1 credit
This course provides students with greater understanding of scanning the abdominal section. This is a continuation of the skills and knowledge acquired in SON 1615. Students will gain greater experience and knowledge through participation in the scanning labs. Offered in the College for Women.
Prerequisites: SON 1615, SON 2015.
Corequisite: SON 1805.

SON 2015 Ultrasound Physics and Instrumentation — 4 credits
This course will focus on the underlying principles of physics and basic concepts critical for developing skills in the use of diagnostic ultrasound. Emphasis will be on basic acoustical physics and acoustical waves in human tissue, ultrasound transmission in soft tissues, attenuation of sound energy, parameters affecting sound transmission, and resolution of sound beams. Also discussed will be image artifacts, Doppler, ultrasound bio-effects, safety, and quality assurance.
Prerequisite: PHYS 1050.

SON 2100 Adult Echo — 4 credits
This course builds on the knowledge and skills learned from cardiovascular principles. The intent of this course is to provide the student with the knowledge necessary to use echocardiographic measures to evaluate cardiomyopathies, coronary artery disease, cardiac diseases due to systemic illness, pericardial diseases, systemic and pulmonary hypertension as well as assessing valvular disease and cardiac masses. This course will provide the student with an understanding of coronary anatomy and distribution, pathophysiology of coronary heart disease, and the echocardiographic assessment of coronary disease. The content of this course will also include echocardiographic calculation of valve gradients, valve areas, and regurgitant volumes.
Prerequisites: SON 1620, SON 1630, SON 1635, SON 2015.

SON 2115 Adult Echo I Lab — 1 credit
This course will provide the student with an understanding of the 2D images as well as the 2D and M-mode measurements required for a complete adult transthoracic exam. At the end of this course, students will be able to perform a normal adult transthoracic exam including all of the 2D and M-mode images and measurements within 60 minutes.
Prerequisites: SON 1620, SON 1630, SON 1635, SON 2015.

SON 2125 Adult Echo II Lab — 1 credit
The intent of this course is to provide the student with an opportunity to perform portions of an echo exam (progression from previous scanning labs), review position, transducer placement, and terminology in the clinical setting. Two-dimensional (2-D) and Doppler measurements, and hemodynamic assessment skills learned in Cardiovascular Principles and Adult Echo will be applied in the clinical lab setting. This opportunity will provide the student clinical application of echocardiography within the echo lab. At the end of the semester, the student will be able to perform a complete adult transthoracic echocardiogram which includes 2D, M-mode, and Doppler hemodynamic assessment within 60 minutes.
Prerequisites: SON 1620, SON 1630, SON 1635, SON 2015.

SON 2205 Obstetrical-Neonatal Sonography — 4 credits
This course builds upon the knowledge gained in Reproductive Systems. It will begin with discussions and materials presented on first, second, and third trimester normal fetal and maternal anatomy as it applies to ultrasound.
Prerequisite: SON 1705.

SON 2210 Obstetrical/Neonatal Skills Lab — 1 credit
This course will provide the intermediate student with the knowledge to scan an obstetric patient. Scanning the fetus will be discussed as it relates to patient history and laboratory data, transducer selection, and scanning protocols. This is a continuation of the skills and knowledge acquired in Reproductive Systems in Sonography.
Prerequisite: SON 1705.

SON 2305 Elementary of Vascular Sonography — 4 credits
This course will introduce students to the foundational discipline-based knowledge and skills necessary to practice vascular ultrasound. Foundational knowledge in vascular physics, Doppler and hemodynamics will be introduced. Knowledge of lower and upper extremity vasculature, crebrovascular structures, abdominal and transplant vascular will be discussed and practiced, in conjunction with SON 2310 Elements of Vascular Sonography Lab. This includes arterial and venous anatomy, physiology and pathology of both upper and lower extremities, cerebrovascular, abdominal vascular, transplant structures, and arterial-venous fistulas.
Prerequisite: Successful completion of all previous sonography courses.
Corequisite: SON 2310.

SON 2310 Elements of Vascular Sonography Skills Lab — 1 credit
This course provides students with comprehensive scanning skills in all areas of the arterial and venous circulation systems. Noninvasive vascular instrumentation, protocols and techniques are introduced. Students will optimize their scanning abilities through participation in the labs. Offered in the College for Adults.
Prerequisite: SON 2015.

SON 2455 Congenital Heart Disease — 2 credits
This course builds on the knowledge and skills learned from cardiovascular principles, cardiac anatomy, and embryology. The intent of this course is to provide the student with the necessary knowledge to recognize and evaluate congenital heart abnormalities by echocardiography. At the end of this course, the student will be able to describe the process of fetal development and circulation. Additionally, students will be able to describe the causes and complications of shunt lesions, obstructive lesions, and cyanotic lesions. This course will also provide an understanding of surgical procedures, both palliative and corrective for congenital heart disease.
Prerequisites: SON 1620, SON 1630, SON 1635, SON 2015.

SON 2460 Concepts in Echocardiography — 4 credits
This course builds on the knowledge and skills learned from cardiovascular anatomy and physiology as well as foundations in echocardiography. The intent of this course is to provide the student with the knowledge necessary to use echocardiographic measures to evaluate cardiomyopathies, cardiac diseases due to systemic illness, pericardial diseases, and systemic and pulmonary hypertension. Emphasis will be placed on pathophysiology of cardiomyopathies, their etiologies, clinical presentation and echocardiographic findings as well as differential diagnosis. Strain echocardiography and its role in assessing cardiomyopathies will also be introduced in this course. And finally, the role of left ventricular assist devices and the indications for cardiac transplantation will be discussed.
Prerequisites: SON 1620, SON 1630, SON 1635, SON 2015.

SON 2500 Adult Echo 2 — 4 credits
This course is designed to introduce students to the utility of echocardiography in the stress lab. The role of stress echo in diastolic function, valve disease, cardiomyopathy, and ischemic heart disease will be covered. Pharmacology and electrocardiography will also be introduced in the course, with an emphasis on their role in stress echocardiography. An important focus of the course will be ischemic heart disease and coronary artery anatomy and distribution as well as non-ischemic causes of chest pain. Additionally, the use of echocardiographic enhancing agents will be covered.
Prerequisites: SON 2100, SON 2115, SON 2125, SON 2450, SON 2460. Offered in the College for Women.

SON 2610 Clinical Ultrasound I — 3 credits
These courses provide the opportunity to apply didactic knowledge to the clinical environment. Students will work under the guidance of registered sonographers in hands-on ultrasound scanning in abdominal, OB/GYN, vascular and superficial parts ultrasound. Students will be at their clinical internships three days per week in SON 2610, four days per week in SON 2620 and five days per week in SON 2630. Offered in the College for Adults.
Prerequisites: Admission to the sonography program and successful completion of prior courses in the program progression. Courses must be taken in this order: SON 2610, SON 2620, SON 2630.

SON 2630 Clinical Ultrasound III — 6 credits
These courses provide the opportunity to apply didactic knowledge to the clinical environment. Students will work under the guidance of registered sonographers in hands-on ultrasound scanning in abdominal, OB/GYN, vascular and superficial parts ultrasound. Students will be at their clinical internships three days per week in SON 2610, four days per week in SON 2620 and five days per week in SON 2630. Offered in the College for Adults.
Prerequisites: Admission to the sonography program and successful completion of prior courses in the program progression. Courses must be taken in this order: SON 2610, SON 2620, SON 2630.

SON 3300 Clinical Practicum I — 8 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered Sonographers.
Prerequisites: SON 1805, SON 1815, SON 2205, SON 2210, SON 2305, and SON 2310.

SON 3305 Small Parts — 1 credit
This course will introduce you to the sonographic anatomy, physiology and pathology of the thyroid, breast, and GI tract. Musculoskeletal ultrasound will be introduced. Knowledge of these structures will be discussed and practiced in conjunction with SON 3310 Small Parts Lab.
Prerequisite: SON 1805.

SON 3310 Small Parts Lab — 1 credit
This course will introduce you to the scanning principles, techniques and protocols of the thyroid, breast, and GI tract. Musculoskeletal ultrasound will be introduced. Knowledge of these structures will be discussed and practiced in conjunction with SON 3305 Small Parts lecture.
Prerequisite: SON 1815.

SON 3400 Clinical Practicum II — 10 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered Sonographers.

SON 3405 Clinical Practicum II — 2 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered sonographers.

SON 3410 Clinical Practicum III — 8 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered sonographers.

SON 3415 Comprehensive Review Lab — 1 credit
This is a hands-on advanced course to prepare the student for clinical rotation in an adult echocardiography lab. The lab will include advanced measurement techniques including continuity equation, pressure half time, wall motion analysis, and comprehensive systolic and diastolic assessment. Emphasis will be placed on analyzing acquired data and presenting that data in a professional manner. Students will also be introduced to echocardiographic measurements and protocols that address specific diseases such as aortic stenosis and mitral regurgitation. Offered in the College for Women.
Prerequisites: SON2100, SON2115, SON2125, SON2450, SON2460.

SON 3420 Clinical Practicum I — 7 credits
This course is designed to integrate the student into the clinical internship and provide the student the opportunity to apply didactic knowledge to the clinical environment. These are off-campus clinical sites under the guidance of registered Sonographers.
Prerequisites: SON2100, SON2115, SON2125, SON2450, SON2460.

SON 3425 Clinical Practicum II — 2 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered Adult Cardiac Sonographers.
Prerequisite: SON 3415.

SON 3430 Clinical Practicum III — 8 credits
The clinical internship provides the opportunity to apply didactic knowledge to the clinical environment. Students will work at off-campus clinical sites under the guidance of registered Adult Cardiac Sonographers.
Prerequisite: SON 3415.

SON 4010 Capstone Project — 1 credit
This course will provides the senior student the ability to apply the knowledge and skills learned in the previous courses and clinical internships that comprise the sonography program. The student's project will have a theoretical/academic and applied components.
Prerequisite: IPE 4200W.

SON 4020 Seminar in Advanced Echo Imaging — 2 credits
This course will provide the student with knowledge and understanding in a variety of areas outside the routine echocardiographic examination including transesophageal echocardiography and perioperative echocardiography. Additional topics, such as 3D echocardiography and radiation safety will also be covered in this course. Students will gain a broad understanding of the clinical utility of echocardiography inside and outside the traditional echocardiography lab.
Prerequisites: SON2100, SON2115, SON2125, SON2450 or SON 2455, SON2460.