SONOGRAPHY

St. Catherine University's sonography department is grounded in the liberal arts and a commitment to compassion, community and caring.

Students will be led into a fascinating profession that challenges their analytical ability and in-depth knowledge of the human body. The program is designed to provide a quality and comprehensive education, through didactic, laboratory, and clinical experiences that prepare students for entry-level positions and to become credentialed sonographers.

Students attend small classroom sessions and receive practical experience in the ultrasound scanning lab and through clinical rotations in area hospitals and other healthcare facilities. Clinical rotations are work-based learning experiences, where students practice what they have learned in a real-life setting under the supervision of a professional.

The Sonography Department offers an Adult Echocardiography and General Track. General includes Abdomen-extended and OB/GYN.

Majors

- Abdomen-Extended, Obstetrics and Gynecology - BS (http://catalog.stkate.edu/undergraduate/health/sonography/sonography-ba-bs/)
- Echocardiography - BS (http://catalog.stkate.edu/undergraduate/health/sonography/echocardiology-ba-bs/)

Course Descriptions

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 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: Admission to the sonography program, PHYS 1050.

Abdomen-Extended, OB/GYN Track Courses:

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. **Prerequisite:** Admission to the sonography program. **Corequisite: SON1615**

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. **Prerequisite:** Admission to the sonography program.

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. **Prerequisite:** Admission to the sonography program **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. **Prerequisite:** Admission to the sonography program

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: Successful completion of all previous sonography courses. **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: Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses. **Corequisite: SON2210**

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: Successful completion of all previous sonography courses.

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, cerebrovascular 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.
Prerequisite: Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses. **Corequisite:3310**

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: Successful completion of all previous sonography courses.

SON 3306 Clinical Practicum I — 6 credits

This course is designed to allow students to apply didactic knowledge to the clinical environment. Students will also apply the skills learned in Abdomen-Extended, OB/GYN and vascular scan labs. This will be the student's first opportunity to interact with patients, nurses, physicians, and sonographers in a clinical lab environment. These are off-campus clinical sites under the guidance and supervision of registered Sonographers. **Prerequisites:** Successful completion of all previous sonography courses.

SON 3406 Clinical Practicum II — 6 credits

The clinical practicum II builds on the knowledge, skills, and experience gained during SON 3306. Students will continue to apply the skills learned in Abdomen-Extended, OB/GYN and vascular scan labs while progressing to less direct supervision during normal examinations. Students will have opportunities to evaluate more pathology under direct and indirect supervision. Students will work at off-campus clinical sites under the guidance of Registered Diagnostic Medical Sonographers and receive hands-on experience. **Prerequisite:** Successful completion of all previous sonography courses.

SON 3416 Clinical Practicum III — 6 credits

The clinical practicum III builds on the knowledge, skills, and experience gained during SON3405. During this clinical internship phase, students will continue to apply the skills learned in Abdomen-Extended, OB/GYN and vascular scan labs while further progressing to less supervision during normal examinations. Students will have opportunities to evaluate more pathology under direct and indirect supervision. Students will work at off-campus clinical sites under the guidance of Registered Diagnostic Medical Sonographers and receive more hands-on experience. **Prerequisite:** Successful completion of all previous sonography courses.

SON 4010 Capstone Project — 1 credit

This course will provide 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 component.
Prerequisite: Successful completion of all previous sonography courses, IPE 4200W.

Echocardiography Track Courses:

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:** Admission to the sonography program. BIOL 2620

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: Admission to the sonography program.
BIOL 2620. **Corequisite: SON1642**

SON 1642 Foundations in Echo Lab — 2 credits

This course will provide the student with an understanding of the basic cardiac ultrasound windows, proper ergonomics to avoid injury, and how to optimize echo images while applying patient care skills learned in the prior patient care (CNA) course. The course will include recognition of cardiac anatomy on an echocardiogram, provide an understanding of machine instrumentation, identify proper 2-D, M-mode, and Doppler techniques, and echocardiographic assessment of systolic and diastolic function. **Prerequisite:** Admission to the sonography program

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:** Successful completion of all previous sonography courses.

SON 2122 Adult Echo Lab — 2 credits

This hands-on course builds on the Foundations Lab by adding more comprehensive 2D and M-mode measurements. Additionally, basic Doppler assessment by pulsed-wave, continuous wave, and color flow imaging will be added to the normal complete echo examination. By the completion of this course, the student will be able to perform a

complete normal echocardiographic examination with 2D and M-mode and the appropriate measurements, as well as basic color flow and spectral Doppler assessment. Students will also have an introduction to echo evaluation of cardiac pathology including valve disease (stenosis and regurgitation) and pulmonary hypertension within this course. **Prerequisites:** Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses.

SON 2510 Adult Echo II — 2 credits

This course builds on the knowledge and skills learned in Adult Echo 1. This course aims to enhance student's ability to recognize cardiac pathologies and perform the appropriate echocardiographic assessments. Emphasis will be placed on the role of echocardiography in evaluating adult cardiac pathology. The clinical competencies the students will perform during their internships will be introduced in this course. Additional topics covered include cardiac masses, mimickers of ischemic heart disease, athletes' hearts, and a review of diastolic function assessment. **Prerequisites:** Successful completion of all previous sonography courses.

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: Successful completion of all previous sonography courses.

SON 2710 Adult Echo III— 1 credit

This course builds on the knowledge and skills learned in Adult Echo 1 and 2. In this course, we will examine the role of stress echocardiography in assessing ischemic heart disease. Students will also be introduced to the utility of echocardiography in the stress lab beyond coronary disease, including valvular assessment and diastolic function assessment. We will also cover the role of echocardiographic enhancing agents (UEA) with a special emphasis on the sonographer's role in the safe administration of UEA. **Prerequisites:** Successful completion of all previous sonography courses.

SON 3360 Clinical Practicum I — 6 credits

This course is designed to allow students to apply didactic knowledge to the clinical environment. Students will also apply the skills learned in Adult Echo scan labs 1 and 2 and the comprehensive review lab. This will be the student's first opportunity to interact with patients, nurses, physicians, and sonographers in a clinical echo lab environment. These are off-campus clinical sites under the guidance and supervision of registered Sonographers. **Prerequisites:** Successful completion of all previous sonography courses.

SON 3426 Clinical Practicum II — 6 credits

The clinical practicum II builds on the knowledge, skills, and experience gained during SON 3360. Students will progress to less direct supervision during normal adult examinations and have opportunities to evaluate more pathology under direct and indirect supervision. Students will work at off-campus clinical sites under the guidance of registered Adult Cardiac Sonographers and receive hands-on experience. **Prerequisites:** Successful completion of all previous sonography courses.

SON 3436 Clinical Practicum III — 6 credits

The clinical practicum III builds on the knowledge, skills, and experience gained during SON3426. During this clinical internship phase, students will continue to enhance their technical and critical thinking skills while performing normal adult echocardiograms and exams with significant pathology. An important focus of CP III will be for the student to integrate 2D and hemodynamic data into an accurate report. By the end of this course, students should be able to function as entry-level adult cardiac sonographers. **Prerequisites:** Successful completion of all previous sonography courses