



Cleveland Clinic

School of Health Professions

Beachwood Diagnostic Medical Sonography Program

Beachwood Diagnostic Medical Sonography

DMS101B - Introduction to Sonography & Patient Care

Clock Hours: 32

This course introduces the student to the world of diagnostic medical sonography and patient care. Topics will include the history and development of ultrasound, professional ethics specific to ultrasound, legal considerations, industry standards and OSHA guidelines, HIPPA, medical records, methods of infection control, proper scanning techniques, and ergonomics including sonographer best practices to reduce injury. In addition, it will cover patient assessment including age-related care and cultural competency, proper transport and transfer of patients with and without support equipment, taking vital signs, patient comfort and modesty, professional roles both in and out of the sonography department, and how to appropriately communicate with patients and department staff. There will be discussion of proper sterile techniques and procedures, personal protective equipment (PPE), and reporting and documenting incidents and/or adverse medication reactions, as well as discussion on hospital and departmental organization, and hospital and program affiliation.

Co-requisites: DMS111B, DMSL111, DPHY100

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program

DMS111B – Diagnostic Medical Sonography – Abdomen I

Clock Hours: 72

This course will introduce the body systems to the students. Topics such as anatomy, physiology, embryology, pathology, pharmacology, pathophysiology, and anatomical variants of the lymphatic system, aorta, inferior vena cava, kidneys, urinary bladder, retroperitoneal cavity, adrenal glands, liver, gallbladder, pancreas and spleen will be discussed. Introduction to sonographic terminology, relational anatomy, cross-sectional imaging, and the importance of sonographic image acquisition of normal and abnormal findings in conjunction with correlating between other modalities to confirm findings will also be discussed.

*There is a corresponding sonography scan lab with this course.

Co-requisites: DMS101B, DMSL111, DPHY100

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program

DMSL111 - Introduction to Sonography Scan Lab

Clock Hours: 64

Selected exercises designed to reinforce concepts covered in DMS 111.

This course is the beginning foundation for scanning and brings what the Abdominal I course teaches didactically into live and simulated practice in a real sonographic lab. Introduction to the ultrasound equipment and how to properly utilize multiple machines to achieve optimum image quality, while adhering to the ALARA principle, is essential to this course. Demonstration of proper patient positioning and technologist ergonomics will be emphasized. Guided instruction will be provided to the student in the art of rocking, tilting, sweeping, and holding the transducer to obtain the images needed will be provided. Multiple scanning techniques and exam protocols, along with the identification of general anatomy, image orientation, and common pathologies will also be covered.

Co-requisites: DMS101B, DMS111B, DPHY100

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program



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DPHY100 - Ultrasound Physics & Instrumentation

Clock Hours: 64

This course is designed to present the physical and mathematical principles of diagnostic medical sonography to the students. Topics will include understanding the physical attributes of sound waves and how images are generated, attenuation, transducer construction and function, ultrasound instrumentation, multi-hertz frequency capabilities, dynamic range, signal processing, bioeffects, display modes, resolution, artifacts, hemodynamics, harmonics and contrast agents, emerging technology, research design, statistics, quality assurance, and Doppler principles.

Co-requisites: DMS101B, DMS111B, DMSL111

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program

DMS112B – Diagnostic Medical Sonography- Abdomen II

Clock Hours: 64

This course details the anatomy, physiology, embryology, pathophysiology, pathology, pharmacology, and anatomical variants of the thyroid and parathyroid glands, male reproductive system, salivary glands, gastrointestinal tract, peritoneal and pleural spaces, breast, extremity non-vascular, musculoskeletal, and neonatal sonography including the hips, spine, and head. Discussion of the sonographer's role in procedures, contrast imaging, elastography (ARFI), shear wave imaging, and the importance of correlation between modalities will be included.

*There is a corresponding sonography scanning lab with this course.

Co-requisites: DMS102B, DMSL102, DCL102

Pre-requisite: DMS111B/DMSL111

DMSL112B - Sonography Scanning Lab II

Clock Hours: 48

In this scanning lab, skills will be taught and developed to perform optimal sonographic examinations of the abdominal organs, to include the thyroid, male reproductive, the gastrointestinal tract, abdominal wall, peritoneum, pleural space, non-vascular extremity, musculoskeletal, and neonatal and pediatric exams. Continued proficiency on aorta, liver, pancreas, gallbladder, kidneys and spleen will also be included. There will be additional training on the ultrasound equipment to master knobology and achieve optimal image quality, while still adhering to the ALARA principle. Demonstration of proper patient positioning and technologist ergonomics will continue to be enforced. Knowledge and discussion of proper exam protocols and patient preparations will be taught, along with examples of scanning techniques to aid in the identification of general anatomy, image orientation, and common pathologies. Lab work will also include simulation-based classwork through SonoSim.

Co-requisites: DMS102B, DMSL102, DCL102, DMS112B

Pre-requisite: DMS111B/DMSL111

DMS102B - Gynecology and Introduction to Obstetrics

Clock Hours: 72

The course details the anatomy, physiology, embryology, pathophysiology, pathology, pharmacology, and anatomical variants during all stages of the female reproductive system, including gynecological disease processes, infertility monitoring, and the developing fetus throughout the first trimester of pregnancy and the important role that sonography plays in fetal diagnosis and treatment. Topics will include fetal biometry and the importance of obstetrical measurements throughout pregnancy, as well as fetal and



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maternal well-being. Medical and surgical interventions, procedures, and the importance of comparative imaging with other modalities will also be discussed. This class will discuss different sonographic approaches and techniques based on standards of care and ethical guidelines. Proper patient preparation, exam protocols, general anatomy, image orientation and common pathologies will also be addressed. Lab work will include live scanning as well as simulation-based classwork through SonoSim.

*There is a corresponding scanning lab with this course.

Co-requisites: DMS112B, DMSL112, DCL102, DMSL102

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program & DMSL 111

DMSL102 - Sonography Scanning Lab III

Clock Hours: 48

Selected exercises designed to reinforce concepts covered in DMS102B.

This scan lab will give students hands-on scanning obstetric and gynecological ultrasound examinations. There will be additional training on the ultrasound equipment to master knobology and achieve optimal image quality, while still adhering to the ALARA principle. Demonstration of proper patient positioning and technologist ergonomics will continue to be enforced. Knowledge and discussion of proper exam protocols and patient preparations will be taught, along with examples of scanning techniques to aid in the identification of general anatomy, image orientation, and common pathologies. Lab work will also include simulation-based classwork through Sono Sim.

Co-requisites: DMS112B, DMSL112, DCL102, DMS102B

Pre-requisite: Admission to Beachwood Diagnostic Medical Sonography Program & DMSL111

DCL102 - Clinical Experience I

Clock Hours: 304

Direct, supervised sessions in the clinical setting that will emphasize development of the practical application of direct and indirect patient care, department workflow and sonographic scanning, as taught in the scanning lab. These applications will have emphasis on knobology, equipment orientation, proper scanning positions and planes, and general patient care. Introductory scanning on patients will include the liver, gallbladder, pancreas, kidneys, urinary bladder, adrenal glands, spleen, aorta, inferior vena cava, thyroid, and neck, and OB/GYN exams. Students will need to successfully complete all the assigned clinical competency examinations while supervised by a registered diagnostic medical sonographer at the assigned clinical site.

Co-requisites: DMS112B, DMSL112, DMS102B, DMSL102

Pre-requisite: Successful completion of Beachwood Diagnostic Medical Sonography Program Term 1

Clinicals: 1st 7 weeks 2 days/week (8 hours daily)
 2nd 8 weeks 3 days/week (8 hours daily)

ETH101 - Healthcare Ethics and Law

Clock Hours: 24

This course is designed to provide the student with a fundamental background in healthcare ethics and law. The historical and philosophical basis of ethics as well as the elements of ethical behavior are also discussed. The student will examine a variety of ethical issues and dilemmas that may occur in clinical



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practice. An introduction to legal terminology, concepts and principles of law will also be presented. Topics include misconduct, malpractice, unintentional and intentional torts, HIPPA standards and compliance, legal and professional standards, the ASRT/ARDMS scope of practice. The importance of proper documentation and informed consent will be emphasized.

Co-requisites: DMS103B, DMSL103, DMS200, DCL103

Pre-requisite: Successful completion of Beachwood Diagnostic Medical Sonography Program Term 2

DMS103B – Advanced Obstetrics

Clock Hours: 54

This course details the anatomy, physiology, embryology, pathophysiology and anatomical variants of normal and common pathologic conditions of the second and third trimesters of pregnancy. The course will cover congenital and chromosomal abnormalities of each of the developing systems, risks of multiple gestations, and maternal disease processes and their impact on pregnancy. Correlation with ultrasound guided perinatal procedures, genetic testing, and medical and surgical interventions are also included. Proper patient preparation, exam protocols, general anatomy, image orientation and common pathologies will also be addressed. Lab work will include live scanning as well as simulation-based classwork through SonoSim.

*There is a corresponding sonography scan lab with this course.

Co-requisites: ETH101, DMS200, DCL103, DMSL103

Pre-requisite: DMS102B/DMSL102

DMSL103 - Sonography Scanning Lab IV

Clock Hours: 36

This course details the anatomy, physiology, embryology, pathophysiology and anatomical variants of normal and common pathologic conditions of the second and third trimesters of pregnancy. The course will cover congenital and chromosomal abnormalities of each of the developing systems, risks of multiple gestations, and maternal disease processes and their impact on pregnancy. Correlation with ultrasound guided perinatal procedures, genetic testing, and medical and surgical interventions are also included. Proper patient preparation, exam protocols, general anatomy, image orientation and common pathologies will also be addressed. Lab work will include live scanning as well as simulation-based classwork through SonoSim.

Co-requisites: ETH101, DMS200, DCL103, DMS103B

Pre-requisite: DMS102B/DMSL102

DCL103 - Clinical Experience II

Clock Hours: 288

Direct, supervised sessions of sonographic scanning with emphasis on the development of the practical application and scanning techniques of obtaining sonographic images of the organs of the male and female reproductive systems, obstetrics, gastrointestinal tract, peritoneal/retroperitoneal and pleural spaces with continued proficiency on the liver, gallbladder, pancreas, kidneys, urinary bladder, adrenal glands, spleen, aorta, inferior vena cava, thyroid, and neck. Students will need to successfully complete all the assigned clinical competency examinations while supervised by a registered diagnostic medical sonographer.



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Co-requisites: DMS103B, DMSL103, ETH101, DMS200

Pre-requisite: DCL102

Clinicals: 12 weeks, 3 days/week (8 hours daily)

DMS200 - Registry Review: SPI

Clock Hours: 24

This course will prepare the students for the Sonographic Principles & Instrumentation (SPI) examination. The course material will follow the current ARDMS Exam Content Outline. The course will review the physical and mathematical principles of diagnostic medical sonography. Knowledge of the physical attributes of sound waves and how images are generated, attenuation, transducer construction and function, ultrasound instrumentation, multi-hertz frequency capabilities, dynamic range, signal processing, bioeffects, display modes, resolution, artifacts, hemodynamics, harmonics and contrast agents, statistics, emerging technology, quality assurance, and Doppler principles will be tested.

Co-requisites: DMS103B, DMSL103, ETH101,

Pre-requisite: DPHY100

DMS223 - Introduction to Vascular

Clock Hours: 16

This eight-week course involves a specialized study of the anatomy, physiology, hemodynamics, pharmacology, clinical signs and symptoms, and pathologies of the cerebrovascular, peripheral arterial, and deep venous systems. Correlation with other modalities, medical and surgical procedures, scanning techniques, direct/indirect testing methods, gold-standards regarding testing and statistics will also be included.

*There is a corresponding sonography scanning lab with this course.

Co-requisite: DMSL223

Pre-requisite: DMS101B, DMS111B, DMS102B, DMS112B, DMS103B

DMSL 223 - Sonography Scanning Lab V

Clock Hours: 24

Selected exercises designed to reinforce concepts covered in DMS 223.

This eight-week course involves a specialized study of the anatomy, physiology, hemodynamics, pharmacology, clinical signs and symptoms, and pathologies of the cerebrovascular, peripheral arterial, and deep venous systems. Correlation with other modalities, medical and surgical procedures, scanning techniques, direct/indirect testing methods, gold-standards regarding testing and statistics will also be included.

Co-requisite: DMS223

Pre-requisite: Successful completion of Beachwood Diagnostic Medical Sonography Program Term 3

DCL201 - Clinical Experience III

Clock Hours: 512

Indirect, supervised clinical hours that continues to emphasize the development of critical thinking skills and exam knowledge on a more independent level. Development of imaging skills in obstetrics and



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gynecology, male reproductive system, and continued proficiency in sonographic scanning techniques of the aorta, inferior vena cava, pleural space, gastrointestinal tract, thyroid, and the organs of the abdomen to include the liver, gallbladder, bile ducts, pancreas, spleen, and the urinary system as taught in the scanning lab. Students need to complete all the assigned clinical competency examinations while supervised by a registered diagnostic medical sonographer.

Co-requisites: DMS22, DMSL223

Pre-requisite: DCL103

Clinicals: 16 weeks, 4 days/week (8 hours daily)

DMS226 - Registry Review-Abdomen

Clock Hours: 16

This eight-week course will prepare the students for their final clinical rotation and the abdominal registry examination. The course material will follow the current ARDMS Exam Content Outline. The review will include the abdomen with emphasis on sonographic abnormalities of the liver, gallbladder, pancreas, kidney, spleen, and aorta. The course will also review sonographic abnormalities of the abdominal wall, breast, pleural space, structures of the neck, peritoneum, retroperitoneum, prostate, scrotum, and superficial structures. Image identification, mock exams, and procedural scenarios will be covered to evaluate knowledge from previous courses.

Co-requisite: DMS230

Pre-requisite: DMS11/DMSL111

DCL202 - Clinical Experience IV

Clock Hours: 512

Indirect, supervised clinical time that continues to emphasize the development of critical thinking skills and exam knowledge on a more independent level. Continued proficiency in sonographic scanning techniques of the liver, gallbladder, bile ducts, pancreas, spleen, urinary tract, aorta, inferior vena cava, non-cardiac chest, gastrointestinal tract, male reproductive, thyroid, gynecology, and obstetrics will be evaluated and tested. Students need to complete all the assigned clinical competency examinations while supervised by a registered diagnostic medical sonographer.

Co-requisites: DMS230, DMS226, DMS227

Pre-requisite: DCL201

Clinicals: 16 weeks, 4 days/week (8 hours daily)

DMS230 - Capstone

Clock Hours: 16

This eight-week course will be utilized for the student to demonstrate the skills and knowledge mastered during the Beachwood Diagnostic Medical Sonography Program both in lecture and at clinicals. Preparation for the employment interview process and presentation of qualifications through a resume and cover letter will be included. Importance of credentialing, professional involvement, career advancement, and continuing education will be stressed. Students will present one interesting case that they performed in the clinical setting to a community of their peers in a formal presentation.



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Co-requisite: DMS226

Pre-requisite: Successful completion of Beachwood Diagnostic Medical Sonography Program Term 4

DMS227 - Registry Review – Ob/Gyn

Clock Hours: 16

This eight-week course will prepare students for the obstetrics and gynecology specialty registry examination. The course material will follow the current ARDMS Exam Content Outline. The course will review the female reproductive system with emphasis on the sonographic appearance of normal and abnormal appearances of the uterus and ovaries and will include obstetrics with the emphasis on fetal biometric measurements and developmental abnormalities, genetic testing, and maternal abnormalities.

Pre-requisite: DMS102B/DMSL102