

# DIAGNOSTIC MEDICAL SONOGRAPHY (DMS)

## DMS-1071 Concepts of Physics in Diagnostic Sonography 2 Credits

Introduction to general physical concepts and related mathematics. Motion, major laws of physics, properties of matter, thermodynamics, basic electricity and electromagnetism, light properties, sound properties, and nuclear physics and their relationship to diagnostic ultrasound discussed.

*Lecture: 2 hours*

*Prerequisite(s): MATH-1410 Elementary Probability and Statistics I or concurrent enrollment; and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

## DMS-1303 Introduction to Sonography 2 Credits

Introduction to the profession of Diagnostic Medical Sonography. Topics focus on professionalism, sonographic terminology, anatomical scanning planes, standard presentation and annotation of ultrasound images, body mechanics, and ergonomics with an overview of diagnostic related imaging specialties.

*Lecture: 2 hours*

*Prerequisite(s): BIO-2331 Anatomy and Physiology I or concurrent enrollment; and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

## DMS-1311 Initial Sonographic Scanning 2 Credits

Application of transducer manipulations, instrumentation controls, body mechanics, sonographic scanning techniques, interpersonal communication, recognition of anatomic structures, and practice of patient care skills in laboratory setting under personal supervision of Registered Diagnostic Medical Sonographer.

*Laboratory: 6 hours*

*Prerequisite(s): Concurrent enrollment in DMS-1401 Abdominal Sonography I and DMS-1500 Gynecologic and Obstetrical Sonography; or DMS-1602 Echocardiography I, or DMS-1701 Vascular Sonography I, or departmental approval: admission to Diagnostic Medical Sonography program.*

## DMS-1320 Introduction to Sonographic Scanning 1 Credit

Introduction to and evaluation of dexterity, visual acuity and sensitivity required to create a sonographic image essential to Diagnostic Medical Sonography. Demonstration through application and manipulation of instrumentation, body mechanics, image annotation and recognition of anatomic structures.

*Lecture: .5 hours. Laboratory: 1.5 hour*

*Prerequisite(s): DMS-1071 Concepts of Physics in Diagnostic Sonography; and DMS-1303 Introduction to Sonography; departmental approval required upon successful completion of DMS-1071 and DMS-1303.*

## DMS-1351 Patient Care Skills 1 Credit

Discussion, demonstration and practice of patient care skills and practical application of basic medical techniques in a lab setting. Introducing principles of patient care including professional communication with diverse populations, safe transferring skills, assessing and attending to patient needs and infection control.

*Laboratory: 3 hours*

*Prerequisite(s): ENG-1010 College Composition I or concurrent enrollment.*

## DMS-1381 Cardiac Diagnostic Procedures 3 Credits

Theory and laboratory practice of entry-level cardiovascular procedures of electrocardiography (ECG). Interpretation practice of 12-lead ECG tracings, fundamentals of Holter monitoring, and pacemakers. Emphasis on technical accuracy in operational, problem solving and quality control skills.

*Lecture: 2.5 hours. Laboratory: 1.5 hour*

*Prerequisite(s): BIO-2341 Anatomy and Physiology II or concurrent enrollment.*

## DMS-1401 Abdominal Sonography I 4 Credits

Study of adult and pediatric normal anatomy and anatomic variants, physiology, pathology, and pathophysiology of the upper abdomen, peritoneal and retroperitoneal cavity including potential spaces, non-cardiac chest, liver, gallbladder, pancreas, urinary system, gastrointestinal system, and abdominal vasculature as visualized by ultrasound. Includes Doppler and color Doppler applications for the liver, gallbladder, pancreas, urinary system, gastrointestinal system, portal system, and great vessels and correlation to other imaging modalities. Correlation to other imaging modalities. Discuss imaging specifics related to medical and surgical interventions that are more often associated with specific populations.

*Lecture: 4 hours*

*Prerequisite(s): Concurrent enrollment in DMS-1311 Initial Sonographic Scanning.*

## DMS-1500 Gynecologic and Obstetrical Sonography 4 Credits

Study of normal anatomy and anatomic variants, physiology, pathology, and pathophysiology of female pelvis (non-pregnant, post-partum and postmenopausal) and female reproductive system as related to sonography. Includes monitoring infertile patient. Anatomy, physiology, anomalies, and pathology of maternal, embryo, and fetal anatomic structures during the first trimester studied. Delineates purpose and appropriateness of transabdominal versus transvaginal scanning approaches with associated patient and ethical issues. Doppler and color Doppler applications and biometrics of non-gravid uterus and ovaries discussed. Includes demonstration of transabdominal examination.

*Lecture: 4 hours*

*Prerequisite(s): Concurrent enrollment in DMS-1311 Initial Sonographic Scanning.*

### **DMS-1602 Echocardiography I**

#### **4 Credits**

Basic theory of echocardiography including study of normal anatomy, anatomic variants, physiology, and pathology of the heart with ultrasound. Includes basic understanding of physical concepts of ultrasound creation and utilization in echocardiography. Visual pathology recognition and identification on transthoracic examination with an understanding of the etiology of cardiovascular disease and affects is included.

*Lecture: 4 hours*

*Prerequisite(s): Concurrent enrollment in DMS-1311 Initial Sonographic Scanning.*

### **DMS-1701 Vascular Sonography I**

#### **4 Credits**

Specialized study of cerebrovascular and peripheral arterial vascular system as related to ultrasound imaging. Focus on anatomy, hemodynamics, pathology and sonographic appearance of normal and diseased arteries. Discussion of direct/indirect testing methods and the sonographic findings. Explanation of medical and surgical interventions used in the treatment of vascular disease.

*Lecture: 4 hours*

*Prerequisite(s): Concurrent enrollment in DMS-1311 Initial Sonographic Scanning.*

### **DMS-1820 Independent Study in Diagnostic Medical Sonography**

#### **1-3 Credits**

Directed individual study. Study/research title and specific content arranged between instructor and student. May be repeated for a maximum of six credits of different topics.

*Lecture: 1-3 hours*

*Prerequisite(s): Departmental approval, and instructor approval, and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

### **DMS-1940 Field Experience I**

#### **1 Credit**

Supervised practical application of sonography scanning techniques in clinical setting under personal supervision of registered diagnostic medical sonographer, or qualified physician. Emphasis on simple-level scanning skills. Student develops skills related to departmental processes, procedures, protocols, and patient care. Clinical experiences in an ultrasound lab.

*Other Required Hours: 192 hours per semester offering.*

*Prerequisite(s): DMS-1311 Initial Sonographic Scanning.*

### **DMS-1950 Field Experience II**

#### **2 Credits**

Supervised practical application of sonography scanning techniques in clinical setting under personal and direct supervision of registered diagnostic medical sonographer or qualified physician. Emphasis on intermediate-level scanning skills. Continued performance of basic-level procedures. Student continues skill development related to departmental processes, procedures, protocols, and patient care. Clinical experience in an ultrasound lab.

*Other Required Hours: Field Experience: 360 hours per semester offering.*

*Prerequisite(s): DMS-1940 Field Experience I.*

### **DMS-2301 Intermediate Sonographic Scanning**

#### **2 Credits**

Advanced application of transducer manipulations, body mechanics, sonographic scanning techniques, interpersonal communication, recognition of anatomic structures, and practice of patient care skills in laboratory setting under personal supervision of Registered Diagnostic Medical Sonographer. Continue competency in scanning basic exams. Develop scanning skills of intermediate sonographic procedures.

*Laboratory: 6 hours*

*Prerequisite(s): DMS-1311 Initial Sonographic Scanning; and concurrent enrollment in DMS-2401 Abdominal Sonography and concurrent enrollment in DMS-2500 Obstetrical Sonography; or concurrent enrollment in DMS-2602 Echocardiography II; or concurrent enrollment in DMS-2702 Vascular Sonography II.*

### **DMS-2330 Sonographic Pathology**

#### **3 Credits**

Specialized study of common disease processes relevant to sonographic imaging. Discussion of differences between inflammatory and infectious diseases, congenital, acquired, and hereditary diseases, and benign, malignant, and metastatic neoplasia in the cardiovascular, digestive, endocrine, lymphatic, respiratory, reproductive, and urinary systems.

*Lecture: 3 hours*

*Prerequisite(s): BIO-2341 Anatomy and Physiology II; and DMS-1303 Introduction to Sonography; and HTEC-1050 Introduction to Medical Terminology, or HTEC-1060 Medical Terminology I; and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

### **DMS-2350 Sonographic Instrument/Physics**

#### **3 Credits**

Physics and related mathematics as applied to ultrasound including the study of acoustical principles, sound transmission, signal processing, transducer construction, ultrasound instrumentation, quality assurance, and bioeffects of diagnostic ultrasound on soft tissue. Study of resolution, display modes, hemodynamics, Doppler principles and related instrumentation as it relates to ultrasound. Modular courses DMS-235A and DMS-235B will also meet the requirements for this course.

*Lecture: 3 hours*

*Prerequisite(s): DMS-1071 Concepts of Physics in Diagnostic Sonography; DMS-1311 Initial Sonographic Scanning; ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

### **DMS-235A Sonographic Principles, Performance, and Safety**

#### **2 Credits**

Physics and related mathematics as applied to ultrasound including the study of acoustical principles, sound transmission, signal processing, transducer construction, ultrasound instrumentation, quality assurance, and bioeffects of diagnostic ultrasound on soft tissue.

*Lecture: 2 hours*

*Prerequisite(s): DMS-1071 Physical Concepts in Diagnostic Sonography; and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

**DMS-235B Doppler Principles and Instrumentation****1 Credit**

Study of resolution, display modes, hemodynamics, Doppler principles and related instrumentation as it relates to ultrasound.

*Lecture: 1 hours*

*Prerequisite(s): DMS-1071 Concepts of Physics in Diagnostic Sonography and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

**DMS-2401 Abdominal Sonography II****4 Credits**

Continuation of normal anatomy and anatomic variants, physiology, pathology, and pathophysiology of various anatomic structures and organ systems as visualized by ultrasound including: adrenal glands, spleen, breast, neck, thyroid, musculoskeletal, male reproductive system, carotid artery and lower extremity venous vasculature. Also covers the normal anatomy and anatomic variants, physiology, pathology and pathophysiology of pediatric hip, spine, and head as visualized by ultrasound. Study of Doppler and color Doppler applications of above mentioned organs and systems. Correlation to other imaging modalities. Discuss imaging specifics related to medical and surgical interventions that are more often associated with specific populations.

*Lecture: 4 hours*

*Prerequisite(s): DMS-1401 Abdominal Sonography I; and concurrent enrollment in DMS-2301 Intermediate Sonographic Scanning.*

**DMS-2450 Breast Sonography****2 Credits**

In-depth study of breast sonography. Study of breast anatomy and physiology as it pertains to medical ultrasound. Detailed discussion of breast pathologies, anatomic variants, benign and malignant lesions, and their anatomic variants, benign and malignant lesions, and their sonographic appearances. Overview of related breast imaging modalities, breast surgical procedures, and breast pathology treatments.

*Lecture: 2 hours*

*Prerequisite(s): DMS-1950 Field Experience II or departmental approval.*

**DMS-2500 Obstetrical Sonography****4 Credits**

Study of normal anatomy and anatomic variants, physiology, pathology and pathophysiology of the gravid pelvis and fetus during second and third trimesters as related to sonography. Focus on fetal biometry, fetal size and age assessment, fetal maturity of second and third trimester, conditions involving multiple gestations, fetal abnormalities, and effects of maternal disease on the pregnancy. Also includes sonographic procedures for amniocentesis, chorionic villus sampling, fetal therapy, Doppler and color Doppler applications of uterine artery, umbilical cord and fetal aorta. Ethical issues in obstetric sonography and support of parental-fetal bonding discussed.

*Lecture: 4 hours*

*Prerequisite(s): DMS-1500 Gynecologic and Obstetrical Sonography; and concurrent enrollment in DMS-2301 Intermediate Sonographic Scanning.*

**DMS-2602 Echocardiography II****4 Credits**

Introduction to physical signs symptoms, and indications for an echocardiogram reviewed for each major pathology. History and physical examination, laboratory tests, invasive and non-invasive hemodynamic evaluations used to assess various cardiovascular pathologies. Theory and manipulation of Doppler echocardiography with an introduction to interrogation of technical findings. Determination of blood flow within the normal and diseased heart using Doppler echocardiography and applying principles of hemodynamic effects learned. Color and spectral Doppler techniques discussed as applied to clinical transthoracic and transesophageal echocardiographic examinations as well as stress echocardiography.

*Lecture: 4 hours*

*Prerequisite(s): DMS-1602 Echocardiography I; and concurrent enrollment in DMS-2301 Intermediate Sonographic Scanning.*

**DMS-2650 Pediatric Cardiac Sonography****3 Credits**

Study of normal and abnormal cardiac anatomy, fetal heart development and perinatal circulation specific to congenital cardiovascular defects. Focus on pediatric echo protocol, exam considerations for the patient population with congenital heart abnormalities (pediatric and adults). Discussion and case study review of simple to complex congenital heart abnormalities. Sonographer's role in the operating room and catheterization lab.

*Lecture: 3 hours*

*Prerequisite(s): DMS-1950 Field Experience II or departmental approval.*

**DMS-2702 Vascular Sonography II****4 Credits**

Specialized study of peripheral venous system and abdominal vessels as related to ultrasound imaging. Focus on anatomy, venous hemodynamics, pathology, sonographic appearance of normal and diseased vessels, testing methods and sonographic impressions. Discussion of penile sonography, test validation/statistics and the correlation of related diagnostic imaging modalities.

*Lecture: 4 hours*

*Prerequisite(s): DMS-1701 Vascular Sonography I; and concurrent enrollment in DMS-2301 Intermediate Sonographic Scanning.*

**DMS-2750 Principles of Vascular Imaging for Abdomen and Cardiac Sonographers****3 Credits**

Course designed for sonographers experienced in scanning abdomen and/or cardiac ultrasound exams. Specialized advanced study of selected vascular examinations in the cerebrovascular, peripheral arterial and peripheral venous systems. Examinations include: carotid, arterial physiologic lower extremity, venous duplex upper and lower extremity. Focus on anatomy, hemodynamics, pathology, sonographic appearance of normal and diseased vessels, specific testing methods and sonographic impressions. This course is not intended to fulfill the requirements necessary to take the credentialing examination for vascular technology.

*Lecture: 2 hours. Laboratory: 3 hours*

*Prerequisite(s): DMS-1950 Field Experience II or departmental approval.*

### **DMS-2760 Transcranial Doppler Sonography**

#### **1 Credit**

Specialized advance study of intracranial circulation using Transcranial Doppler (TCD) and Transcranial Duplex Imaging (TCI). Focus on anatomy, pathology, applications of TCD/TCI, sonographic scanning technique and interpretation of TCD and TCI.

*Lecture: .5 hours. Laboratory: 1.5 hour*

*Prerequisite(s): DMS-2301 Intermediate Sonographic Scanning, or concurrent enrollment.*

### **DMS-281S Special Advanced Laboratory Topics in Diagnostic Medical Sonography**

#### **1-3 Credits**

Specialized two-hour lab per credit focusing on advanced topics or current issues in Diagnostic Medical Sonography (see Credit Schedule of classes for current offerings). Repeatable for different topics. No more than six credits of special topics courses may be applied toward elective and/or program graduation degree requirements.

*Laboratory: 2-6 hours*

*Prerequisite(s): Faculty counterparts determine appropriate prerequisite/corequisite for each topic.*

### **DMS-2820 Independent Advanced Study**

#### **1-3 Credits**

Directed individual advanced study. Study/research title and specific content arranged between instructor and student. May be repeated for a maximum of six credits of different topics.

*Lecture: 1-3 hours*

*Prerequisite(s): Departmental approval, and instructor approval, and ENG-0995 Applied College Literacies, or appropriate score on English Placement Test. Note: ENG-0990 Language Fundamentals II taken prior to Fall 2021 will also meet prerequisite requirements.*

### **DMS-2940 Field Experience III**

#### **3 Credits**

Supervised practical application of sonography scanning techniques in clinical setting under direct supervision of registered diagnostic medical sonographer or qualified physician. Independent scanning of all levels of procedures with emphasis on accuracy and exam duration. Student focuses skill development of professional and technical accuracy and speed. Clinical experience in an ultrasound lab.

*Other Required Hours: Field Experience: 576 hours per semester.*

*Prerequisite(s): DMS-1950 Field Experience II.*

### **DMS-2950 Field Experience IV**

#### **1 Credit**

Supervised practical application of sonography scanning techniques in clinical setting under direct supervision of registered diagnostic medical sonographer or qualified physician. Independent scanning of all levels of procedures with emphasis on accuracy and exam duration. Student focuses skill development of professional and technical accuracy and speed. Clinical experience in an ultrasound lab.

*Other Required Hours: Field Experience: 192 hours per semester.*

*Prerequisite(s): DMS-2940 Field Experience III.*

### **DMS-2960 Supplemental Field Experience**

#### **2 Credits**

Supervised practical application of sonography scanning techniques in clinical setting under personal supervision of registered diagnostic medical sonographer or qualified physician. Emphasis on intermediate scanning skills in the supplemental sonographic specialty. Student develops skills specific to the specialty as related to departmental processes, procedures, protocols, and patient care. Experience in a clinical sonography lab setting.

*Other Required Hours: Field Experience: 360 hours per semester offering.*

*Prerequisite(s): DMS-2950 Field Experience IV*

### **DMS-2981 Specialty Registry Review**

#### **1 Credit**

Global review of anatomy, physiology, and pathology in relation to sonography. Test taking skills, image identification, and procedural scenarios covered. Special focus on exam content outline topics to assist student preparing to take national credentialing examinations for sonography.

*Lecture: 1 hours*

*Prerequisite(s): DMS-2301 Intermediate Sonographic Scanning.*

### **DMS-2983 Supplemental Specialty Registry Review**

#### **1 Credit**

Global review of anatomy, physiology, and pathology in relation to the specific sonographic specialty. Test taking skills, image identification, and procedural scenarios covered. Special focus on the specialty exam content outline topics to assist student preparing to take supplemental national credentialing examinations for sonography.

*Lecture: 1 hours*

*Prerequisite(s): DMS-2301 Intermediate Sonographic Scanning.*

### **DMS-2985 Physics Review**

#### **1 Credit**

Global review of physics in relation to sonography. Test-taking skills, image identification, and physical concept scenarios covered. Special focus on exam content outline topics to assist students preparing to take national credentialing examinations for sonography.

*Lecture: 1 hours*

*Prerequisite(s): DMS-235A Sonographic Principles, Performance, and Safety or concurrent enrollment; and DMS-235B Doppler Principles and Instrumentation or concurrent enrollment, or DMS-2350 Sonographic Instruments and Physics, or concurrent enrollment.*

### **DMS-2991 Sonography Capstone**

#### **1 Credit**

Capstone course in Diagnostic Medical Sonography. Assessment of one's integration of the coursework, knowledge, experience and skills as Diagnostic Medical Sonography student. Preparation for employment interview and presentation of qualifications through resume and cover letter writing. Understanding the departmental process of exam coding and departmental lab accreditation. Importance of credentialing, profession involvement and continuing education stressed.

*Lecture: 1 hours*

*Prerequisite(s): DMS-1950 Field Experience II.*