



DMS-510: SONOGRAPHY CROSS-SECTIONAL ANATOMY (FORMERLY DMS-110)

Effective Term

Fall 2026

BOT Approval Date

01/15/2026

Discipline

DMS - Diagnostic Medical Sonography

Course Number

510

Course Title

Sonography Cross-Sectional Anatomy (formerly DMS-110)

Short Title

Sonography Cross-Sectional

Credit Status (CB 04)

D - Credit - Degree applicable

Units**Lecture Units**

2.00

Total Units

2.00

Hours**Lecture Contact Hours**

32-36

Out of Class Hours Lecture

64-72

Total Contact Hours

32 - 36

Total Out of Class Hours

64 - 72

Total Student Learning Hours

96 - 108

Distance Education

No

Catalog Description

This course provides sonography students with foundational knowledge in cross-sectional anatomy as visualized through ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI). Emphasis is placed on identifying normal anatomical structures and understanding their spatial relationships across multiple imaging modalities. Students will learn to correlate cross-sectional anatomy with pathological findings, enhancing their ability to interpret prior imaging studies and support diagnostic accuracy. Anatomical regions covered include the brain, thorax, abdomen, pelvis, and vascular system. (formerly DMS-110)



Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)

DMS-500 (with a grade of C or better).

Codes

TOP Code (CB 03)

1227.00* - *Diagnostic Medical Sonography

CIP Code

51.0910 - Diagnostic Medical Sonography/Sonographer and Ultrasound Technician.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Minimum Qualifications

Minimum Qualifications	And/Or
Diagnostic Medical Technology	End

Learning Objectives

Learning Objectives

Learning Objective

1. Compare and contrast the concepts of image acquisition from computerized tomography, magnetic resonance imaging, and ultrasound equipment.
2. Evaluate and locate brain anatomy and the major segments of the skull along with bony landmarks.
3. Diagram and label thoracic anatomy including lungs, heart, mediastinal structures, and spine.
4. Differentiate and label abdomen anatomy including liver, pancreas, kidneys, spleen, major arterial and venous structures, gallbladder and intestines.
5. Distinguish and label the different areas of the pelvic anatomy including muscles, uterus, ovaries, adenxa, prostate, and testicles.
6. Compare and contrast computerized tomography (CT), magnetic resonance imaging (MRI) and ultrasound images of the brain, thorax, abdomen and pelvic structures.
7. Distinguish the relationships between structures located within the brain, thorax, abdomen and pelvic structures.
8. Diagram and label the arterial and venous vascular systems in the abdomen and describe their relationship with other structures within the abdomen.
9. Demonstrate cultural competence by applying awareness of racial, ethnic, and cultural diversity to patient-centered sonographic care, including respectful communication, ethical decision-making, and adaptation of scanning practices to meet individual patient needs.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome

1. Students will identify and label major abdominal organs; including the liver, pancreas, gallbladder, kidneys, spleen, stomach, intestines, and major abdominal vessels—on cross-sectional computed tomography (CT) images.
2. Students will recognize and label key intracranial structures; such as the falx cerebri, thalamus, anterior horns of the lateral ventricles, and cavum septum pellucidum, on neonatal cranial ultrasound images.
3. Students will compare and contrast the imaging characteristics, clinical applications, and anatomical presentation of ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) exams.

4. Students will correlate cross-sectional anatomical structures across multiple imaging modalities to support accurate sonographic interpretation.
5. Students will distinguish normal anatomical variants from pathological findings in cross-sectional imaging relevant to sonographic practice.
6. Students will apply cross-sectional anatomical knowledge to enhance image acquisition, interpretation, and interdisciplinary communication in clinical sonography settings.
7. Students will apply cultural competence in sonographic practice by integrating awareness of racial, ethnic, and cultural diversity into respectful communication, ethical decision-making, and adaptation of scanning techniques to support equitable, patient-centered care.

Content

Course Lecture Content

I. Image Acquisition Modalities

- A. Computerized Tomography (CT)
- B. Magnetic Resonance Imaging (MRI)
- C. Ultrasound (US)

II. Head

- A. Anatomical Overview
- B. Cranial Bones
- C. Meninges
- D. Structures Within the Brain
- E. Vascular System
- F. Image Correlations: CT, MRI, US

III. Thorax

- A. Anatomical Overview
- B. Bony Thorax
- C. Lungs
- D. Heart
- E. Blood Vessels
- F. Image Correlations: CT, MRI, US

IV. Abdomen

- A. Anatomical Overview
- B. Kidneys
- C. Liver, Portal and Hepatic Veins
- D. Gallbladder
- E. Biliary System
- F. Spleen
- G. Pancreas
- H. Muscles
- I. Image Correlations: CT, MRI, US

V. Pelvis

- A. Anatomical Overview
- B. Bony Structures
- C. Urinary System
- D. Female Reproductive System
- E. Male Reproductive System
- F. Muscles
- G. Image Correlations: CT, MRI, US

VI. Abdominal Vascular Systems

- A. Arterial System

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1. Abdominal Aorta
 - a. Celiac Artery
 - b. Superior Mesenteric Artery
 - c. Renal Arteries
 - d. Inferior Mesenteric Artery
 - e. Common Iliac Artery
 - i. Internal Iliac Artery
 - ii. External Iliac Artery
 - B. Venous System
 1. Inferior Vena Cava
 2. Superior Mesenteric Vein
 3. Splenic Vein
 4. Renal Veins
 5. Inferior Mesenteric Vein
 6. Common Iliac Vein
 - a. Internal Iliac Vein
 - b. External Iliac Vein
 - VII. Cultural Competence in Sonographic Practice
 - A. Demonstrate awareness of racial, ethnic, and cultural diversity
 - B. Apply respectful communication strategies in patient interactions
 - C. Incorporate ethical decision-making in diverse clinical scenarios
 - D. Adapt scanning techniques to meet individual patient needs
 - E. Promote equitable, patient-centered diagnostic care

Methods of Instruction

Method

Discussion

Integration

A classroom discussion between student groups and the instructor discusses and analyzes images from different imaging modalities and compares them to those of the same anatomy.

Method

Lecture

Integration

Lecture will be used to inform students about the relationship of body anatomy as seen on CT, MRI and ultrasound.

Method

Lecture

Integration

Visual demonstration of the relationships of human anatomy will be presented using various media such as: video, and slide presentations.

Method

Online Activity/Discussion

Integration

The instructor will discuss this assignment in class: students will be directed to read the assignment in the CMS and apply ultrasound, CT, and MRI findings in the context of Ms. Linda's clinical presentation and social determinants of health. Instruction will include instructor-facilitated CMS discussion, prompts addressing anatomical and DEI considerations, and formative feedback on student reflections. Emphasis will be placed on integrating cultural competence, ethical reasoning, and anatomical knowledge to support diagnostic interpretation and patient-centered care.

Methods of Evaluation**Method**

Exams/Tests

Integration

Midterm and Final Exams will assess the students ability to retain and process recognition of anatomy in different imaging modalities.

Method

Homework

Integration

Homework will be assigned weekly from a cross-sectional workbook or instructor resource that consists of anatomy labeling and image recognition to evaluate the students knowledge of anatomy and imaging modalities discussed in class.

Method

Quizzes

Integration

Quizzes will monitor and evaluate the student's immediate understanding of concepts in sectional imaging.

Method

Class Participation

Integration

Class participation should include respectful peer interaction, thoughtful analysis of clinical scenarios, and application of inclusive communication strategies. Responses will be assessed for clarity, empathy, and relevance to sonographic practice. Evaluation will emphasize the student's ability to engage in professional dialogue, demonstrate awareness of health disparities, and articulate ethical approaches to patient-centered care. Contributions should reflect critical thinking, cultural sensitivity, and alignment with diversity, equity, and inclusion (DEI) principles.

Method

Class Performance

Integration

Class engagement in group discussions, demonstration of anatomical recognition, and articulation of imaging concepts will be assessed for clarity, confidence, and retention of cross-sectional anatomy knowledge. Evaluation will emphasize the student's ability to interpret anatomical structures as seen in CT imaging, apply relevant terminology, and contribute meaningfully to collaborative review sessions. This method supports the development of spatial reasoning and diagnostic insight in advanced imaging contexts.



Assignments

Assignment Type

Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

You will complete short-answer quiz questions that will include: identifying anatomy from diagnostic images of computerized tomography, magnetic resonance, and sonography of the brain, heart, abdomen and pelvis demonstrating proper organ placement in relationship to neighboring structures and using proper labeling techniques.

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

As a group assignment, you will view and discuss a video of a Radiologist reading an abdominal CT of the abdomen and pelvis. Include your impression of the protocol, the radiologists responsibility as a healthcare provider, and your degree of confidence in identifying correct anatomy in cross-section.

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Summative

Assignment

Repeat the in class assignment to view and discuss a video of a Radiologist reading an abdominal CT of the abdomen and pelvis; discuss the degree of understanding that has evolved over the semester and how clinical training has contributed to your knowledge and confidence in reading CT and MRI scans.

Assignment Type

Writing

In-class and/or outside of class

In-class

Formative or Summative

Summative

Assignment

In this final exam you will answer multiple-choice and short answer questions based on anatomy, pathology, scanning protocols, and multimodality imaging comparisons, and image-based case questions with patient history, and/or symptoms in which you will

use critical thinking to determine the most likely diagnosis based on sonographic findings, and recognition of anatomy in different imaging modalities.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

In this writing assignment you will analyze a cross-sectional anatomy case study in which an obese patient has abdominal pain. The objective is to apply diversity, equity, and inclusion in an imaging interpretation.

Use the following patient profile:

- Name: Ms. M
- Age: 52
- Sex: Female
- Ethnicity: Latina
- Primary Language: Spanish (English proficient)
- Height/Weight: 5'4", 245 lbs (BMI: 42.0 – Class III Obesity)
- Chief Complaint: Persistent right upper quadrant abdominal pain for 3 weeks
- Medical History: Hypertension, Type 2 Diabetes, Nonalcoholic Fatty Liver Disease (NAFLD)
- Social Determinants of Health:
 - Limited access to specialty care
 - Relies on public transportation
 - Primary caregiver for elderly parent
- Medications: Metformin, Lisinopril

This is the clinical scenario:

Ms. M presents with dull, aching pain in the right upper quadrant, worsened after meals. Her provider orders abdominal ultrasound, CT, and MRI to evaluate hepatobiliary structures and rule out gallbladder pathology or hepatic lesions. The sonographer notes challenges due to body habitus and emphasizes culturally sensitive communication and patient comfort during the exam.

Here are the imaging summary questions you will answer on a worksheet:

- How does obesity affect spatial relationships and visibility of abdominal structures across modalities?
- What anatomical clues support a diagnosis of NAFLD or chronic cholecystitis?

Reflect on these diversity, equity, and inclusion questions:

- How might Ms. M's cultural background and caregiving role influence her imaging experience?
- What inclusive communication strategies can sonographers use to ensure dignity and comfort?
- How do social determinants of health impact access to imaging and follow-up care?

Here are the learning objectives:

By the end of this activity, you will be able to:

- Identify normal and pathological abdominal anatomy across ultrasound, CT, and MRI
- Recognize the impact of body habitus and cultural context on image acquisition and interpretation
- Apply DEI principles to sonographic practice and patient interaction
- Support diagnostic reasoning using multimodal imaging and patient history

Points will be awarded on the discussion response using these guidelines:

Prompt #1-

Student Response:

A respectful, empathetic approach, acknowledging her caregiving role and cultural values; can improve trust and communication during imaging.



Prompt #2-

Student Response:

Sonographers should use clear, respectful language, avoid assumptions about body size, and offer positioning options that reduce discomfort. Asking permission before touching, explaining each step, and using trauma-informed care principles can help patients feel safe and respected.

Prompt #3-

Student Response:

Limited transportation and caregiving responsibilities may prevent Ms. Martinez from attending follow-up appointments or accessing specialty imaging. These barriers can delay diagnosis and treatment. Providers should consider flexible scheduling, patient navigation services, and community resources to support equitable care.

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

In the assigned textbook Sectional Anatomy for Imaging Professionals, read pages 10 through 20 in Chapter 1, which covers anatomic positions and planes: including sagittal, coronal, axial, and oblique views. Reflect on the following concepts: external and internal landmarks used in cross-sectional imaging, body cavities, abdominal quadrants, and regions. Create a drawing in your sketchbook that outlines these concepts, and include comments on each anatomic position and body plane.

Course Materials

Textbooks

Sectional Anatomy for Imaging Professionals By Connie Petersen, Lorrie L. Kelley, Connie Petersen MS RT(R), et al. (12/2025); ISBN: 0323827888; ISBN13: 9780323827881.

Class Size Information

Class Size

30

Class Size Category

F - Individualized, skills#based instruction/field practice 30

Diversity and Inclusion

Course Design and Materials: Course will incorporate diverse perspectives, authors, and examples that reflect a variety of cultures, identities, and lived experiences. Instructional materials will be reviewed regularly to ensure representation, inclusivity, and alignment with equity-minded practices across disciplines.

Inclusive Learning Environment: Instructors will establish classroom norms and policies that promote respect, civil discourse, and belonging in both online and face-to-face classes. Clear expectations for communication and engagement will support a learning space where all students feel valued and heard.

Accessible Instruction: Course content will be delivered using accessible design. Materials will follow accessibility guidelines within the CMS, including captioned media, readable document formats, and multiple means of engagement to support diverse learning.

Equitable Teaching Practices: Instructors will use transparent and grading criteria, varied assessment methods, and timely feedback to promote fairness and student success. Opportunities for revision, reflection, and multiple demonstrations of learning may be incorporated when appropriate to the discipline.

Culturally Responsive Pedagogies: Instructional strategies will encourage critical thinking about diverse perspectives and systems of power relevant to the course content. Faculty will foster opportunities for students to connect course material to real-world contexts.

Ongoing Reflection and Improvement: Faculty will engage in continuous professional development related to IDEAA principles and reflect on course practices using metacognition to identify opportunities for increased equity, inclusion, and accessibility.

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Students apply their didactic patient care knowledge in this course through experiential learning that emphasizes inclusive, equitable clinical practice. Course objectives explicitly incorporate cultural competence, trauma-informed care, and patient-centered communication strategies to prepare students for interactions with diverse populations. Instructional methods include scenario-based simulations, role-play, and reflective debriefs that foreground respectful care across varied cultural, anatomical, and psychosocial contexts. Evaluation methods assess not only technical proficiency but also the student's ability to demonstrate empathy, adapt communication, and uphold ethical standards in diverse clinical situations. Assignments and case studies are intentionally selected to represent a wide range of patient identities, health disparities, and care needs, reinforcing DEI as a core component of sonographic professionalism and advocacy.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

This course promotes equity by embedding inclusive practices across assignments, instruction, evaluation, content, and interactions to support diverse learners. Assignments feature patient scenarios that reflect anatomical variation, cultural identities, and health disparities. Instruction is delivered through multimodal strategies: visual, auditory, and kinesthetic, to accommodate varied learning styles and foster engagement. Evaluation methods assess both technical accuracy and the ability to apply patient-centered reasoning in diverse clinical contexts. Course content emphasizes anatomical diversity and the influence of social determinants on imaging interpretation. Interactive components encourage respectful dialogue and cultural humility, preparing students to deliver equitable, empathetic care across populations.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students interact with each other in this course by conducting a quiz review with a classmate the following week after each quiz. This review and sharing process enables students to tutor each other and encourage each other. In small groups of 3 to 4, students view and discuss a video of a Radiologist reading an abdominal CT of the abdomen and pelvis. They collaborate on their impression of the protocol, the radiologists responsibility as a healthcare provider, and their degree of confidence in identifying correct anatomy in cross-section.

Explain how the course will incorporate instructor-to-student interaction.

Instructor-to-student interaction in this course is facilitated through structured guidance, real-time feedback, and personalized support during didactic learning. The instructor actively engages students through interactive lectures, image interpretation walkthroughs, and facilitated discussions that reinforce spatial reasoning and anatomical recognition across ultrasound, CT, and MRI modalities. Quiz reviews and one-on-one check-ins allow the instructor to monitor progress and address individual learning needs. This consistent interaction ensures students build diagnostic confidence while deepening their understanding of cross-sectional anatomy in a supportive, inclusive environment.

Explain how the course will incorporate student-to-content interaction.

Student-to-content interaction in this course is facilitated through active engagement with cross-sectional anatomy across multiple imaging modalities. Students interpret ultrasound, CT, and MRI visuals to identify anatomical structures and spatial relationships, reinforcing diagnostic reasoning through direct analysis of clinical content. Interactive lectures, case-based discussions, and multimodal resources support varied learning styles, ensuring students connect meaningfully with course material and build confidence in applying anatomical concepts to real-world diagnostic scenarios.

Explain how the course will incorporate student-to-self interaction (metacognitive).

This course incorporates student-to-self interaction by fostering metacognitive awareness through structured reflection and self-assessment. Note taking and sketchbooks are encouraged which allow students to process anatomical concepts in their own words or visuals, promoting personal insight and reinforcing spatial understanding. By incorporating self-directed review of their progress over the semester, the course cultivates a safe space for introspection, empowering students to monitor their learning and develop as thoughtful, adaptive healthcare professionals.