

# DMS-1320: INTRODUCTION TO SONOGRAPHIC SCANNING

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## Cuyahoga Community College

**Viewing: DMS-1320 : Introduction to Sonographic Scanning**

**Board of Trustees:**

September 2023

**Academic Term:**

Fall 2024

**Subject Code**

DMS - Diagnostic Medical Sonography

**Course Number:**

1320

**Title:**

Introduction to Sonographic Scanning

**Catalog Description:**

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.

**Credit Hour(s):**

1

**Lecture Hour(s):**

.5

**Lab Hour(s):**

1.5

## Requisites

**Prerequisite and Corequisite**

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.

## Outcomes

**Course Outcome(s):**

Demonstrate application of sonography content, dexterity, visual acuity and sensitivity necessary to create sonographic images.

**Objective(s):**

1. Demonstrate visual acuity and sensitivity, good body mechanics, and use of the equipment's ergonomic features.
2. Identify normal anatomic structures.
3. Demonstrate dexterity by manipulating probe and equipment to optimize the sonographic image.
4. Demonstrate application of physics using the system's instrumentation.
5. Perform basic sonographic imaging of anatomic structures per program protocols.

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**Methods of Evaluation:**

1. Lab competencies
2. Image Identification
3. Anatomy Identification
4. Oral Assessments

**Course Content Outline:**

Topical Outline

1. Scanning Essentials
  - a. Bioeffects and Safety
    - i. Proper system turn on/shut down procedures
    - ii. Ergonomic features of the equipment
    - iii. Body mechanics
    - iv. ALARA (as low as reasonably achievable)
  - b. Dexterity required to produce images
  - c. Visual acuity and sensitivity
  - d. Transducer selection, manipulation and sanitation
2. Image Presentation
  - a. Scanning planes
  - b. Sonographic terminology
  - c. Image annotation
3. Exam Protocols
  - a. Anatomic structure identification and measurement
    - i. Abdominal organ
    - ii. Heart
    - iii. Vasculature
  - b. Exam imaging
    - i. Ambidexterity
    - ii. Upper body strength
    - iii. Control manipulation
    - iv. Probe manipulation
    - v. Work environment
    - vi. Application of knowledge to the exam
  - c. Image optimization (physics application)
    - i. Gain
      1. 2D (two dimensional)
      2. Time-Gain Compensation
      3. Color Doppler
      4. Spectral Doppler
    - ii. Dynamic range/compression
    - iii. Focal zones
    - iv. Depth
      - v. Frequency (penetration vs. resolution)
    - vi. Field of view
    - vii. Frame rate
    - viii. Color scale
    - ix. Flow direction
      - x. PRF (pulse repetition frequency) scale
    - xi. Spectral gate
    - xii. Color box
      1. Steer
      2. Size
    - xiii. Measurements
      1. Peak Systolic
      2. End Diastolic
    - xiv. Flow resistance
4. Imaging Modalities Correlation
  - a. Computed Tomography of Abdomen/Pelvis
  - b. Angiography
  - c. Computed Tomography of Head/Neck
  - d. EKG (electrocardiogram)

**Resources**

Craig, Marveen. *Craig's Essentials of Sonography and Patient Care*. 4th. St. Louis: Elsevier Saunders, 2017.

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Curry, Reva A. and Betty Bates Tempkin. *Sonography: Introduction to Normal Structure and Function*. 5th. St. Louis: Saunders, 2020.

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Harry, Mark J. *Essentials of Echocardiography and Cardiac Hemodynamics*. 4thd. : Cardiac Ultrasound Consulting, 2014.

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Otto, Catherine. *Textbook of Clinical Echocardiography*. 6th. Philadelphia: Elsevier Saunders, 2018.

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Penny, Steven M. *Introduction to Sonography and Patient Care*. 2nd ed. Wolters Kluwer, 2021.

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Penny, Steven M. and Traci Fox. *Examination Review for Ultrasound: SPI: Sonographic Principles and Instrumentation*. 2nd ed. Wolters Kluwer, 2018.

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Ridgway, Donald P. *Introduction to Vascular Scanning: A Guide for the Complete Beginner*. 4th. Pasadena: Appleton Davies, 2014.

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#### **Resources Other**

- General and Vascular references: <https://ultrasoundpaedia.com/>
- Echo references: <https://www.echocardiographer.org/> 2020.
- Open Stax College Physics. Access via: <https://openstax.org/details/college-physics> (<https://openstax.org/details/college-physics/>). 2022.

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