

NOVA COLLEGE-WIDE COURSE CONTENT SUMMARY
DMS – 209 ULTRASOUND PHYSICS AND INSTRUMENTATION II (2 CR.)

Course Description

Focuses on the areas of ultrasound instrumentation, image artifacts, biologic effects, and quality control. Explores Doppler principles and applications and basic types of equipment. Lecture 2 hours per week.

General Course Purpose

The purpose of this course is to introduce students to the fundamental principles of acoustical physics.

Course Prerequisites/Corequisites

Prerequisite: DMS 190, DMS 206, DMS 207, DMS 217, DMS 208, and DMS 218 courses with a grade of “C” or better.
Corequisite: DMS 196, and DMS 219.

Course Objectives

Upon completing the course, the student will be able to:

The DMS 209 Ultrasound Physics and Instrumentation II course objectives align with the National Education Curriculum for Sonography (NEC) provided by the Joint Review Committee on Education in Diagnostic Medical Sonography (JRC DMS). <http://www.jrcdms.org/nec/>

At the end of this course, the student will be able to:

- a) Identify the characteristics of sound.
- b) Identify the wave properties of sound.
- c) Describe sound waves, propagation of ultrasound through tissue, reflection, refraction, and scattering.
- d) Explain transducer technology, and discuss the advantages and limitations of the various types.
- e) Discuss the basic features of medical sonographic equipment, including operator controls and image processing.
- f) Describe the role of advanced scanning features, including harmonics, coded excitation, and compounding.
- g) Explain how pulsed Doppler, color flow imaging, and amplitude imaging is achieved.
- h) Recognize and describe image artifacts and techniques to minimize or eliminate them.
- i) Describe the importance of performance, safety, and output measurements and standards.
- j) Discuss the basic features of medical sonographic equipment, including operator controls and image processing.

Major Topics to be Included

- a) Fluid and hemodynamics
- b) Doppler principles
- c) Doppler instrumentation controls
- d) Spectral Doppler – PW and CW
- e) Color Doppler – Color and Power
- f) Image Artifacts
- g) Bioeffects and ALARA
- h) Quality Assurance
- i) Contrast Imaging
- j) Harmonic Imaging
- k) Focused Ultrasound
- l) Elastography