

# DMS 52C: PHYSICAL PRINCIPLES OF DIAGNOSTIC MEDICAL SONOGRAPHY III

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	2
<b>Hours:</b>	2 lecture per week (24 total per quarter)
<b>Prerequisite:</b>	DMS 52B.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	CSU
<b>Grade Type:</b>	Letter Grade Only
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- Identify quality control procedures utilized in diagnostic ultrasound systems.
- Explain the principles of harmonic imaging and volume scanning.

## Description

A continuation of DMS 52B with an emphasis on advanced principles in medical ultrasound instrumentation, artifacts, quality assurance, bioeffects, volume rendering, use of doppler imaging and sonographic quality control procedures. Preparation for national examinations. Intended for students in the Diagnostic Medical Sonography Program; enrollment is limited to students accepted in the program.

## Course Objectives

The student will be able to:

- explain the principles of harmonic imaging and volume scanning.
- define and identify the various types of hemodynamic flow and doppler patterns.
- identify quality control procedures utilized in diagnostic ultrasound systems.
- explain bioeffects principles and manufactures safeguards.
- pass the national board examination practice exams.

## Course Content

- Harmonic acoustic imaging and volume scanning
  - principles of harmonics and volume techniques
  - differentiating the sonographic image using the various techniques
  - comparison of techniques and end results
- Principles of hemodynamics
  - waveforms
  - incorporation of doppler flow techniques to aid in diagnosis
  - spectral analysis
  - doppler physics and image display
  - color power imaging
- identify quality control procedures utilized in diagnostic ultrasound systems
- Bioeffects, patient safety and the AIUM standards

- demonstrate using the AIUM approved phantom and test object for quality assurance
  - bioeffect research and outcomes in contrast with manufacturer design
  - names of intensities only found in pulsed wave ultrasound
  - ALARA
  - dosimetric quantities
  - values for diagnostic equipment, such as SPTA (spatial peak temporal average), TI (thermal index)
  - documentation for quality assurance
- Preparation for national board examination
    - elementary principles of waveforms
    - propagation of ultrasound through tissues
    - transducers
    - pulse echo instruments
    - image storage and display
    - image features
    - artifacts
    - safety

## Lab Content

Not applicable.

## Special Facilities and/or Equipment

- DVD/TV video system, internet access, computer, overhead projector.

## Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

- Practice board
- Exam test questions
- Quizzes, final exam

## Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

- Lecture presentations
- Classroom discussions

## Representative Text(s) and Other Materials

Edelman, Sidney. *Understanding Ultrasound Physics*. 5th ed. Woodlands, TX: ESP, Inc., 2018.

## Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

- Read text assignments as per syllabus - estimated as 20 pages per week.

## Discipline(s)

Diagnostic Medical Technology