DMS 52A: PHYSICAL PRINCIPLES OF DIAGNOSTIC MEDICAL SONOGRAPHY I

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	2
Hours:	2 lecture per week (24 total per quarter)
Prerequisite:	DMS 50A.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	CSU
Grade Type:	Letter Grade Only
Repeatability:	Not Repeatable

Student Learning Outcomes

- Calculate/solve mathematical equations related to ultrasound physics.
- Describe propagation of sound waves characteristics.

Description

The course includes physical principles of diagnostic ultrasound, wave characteristics, sound parameters, and review of mathematical skills. In addition, the course emphasizes topics including Doppler, sound beam characteristics, display modes, transducers, and patient-centered equipment settings. 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:

1. Utilize basic mathematical skills by solving equations
2. Describe propagation of sound wave and its characteristics
3. Discuss Doppler and its applications
4. Physical principles of various transducers and their applications
5. Discuss ALARA (as low as reasonably achievable) principles delivering patient centered care

Course Content

1. Math review, including:
    a. Algebraic equations and logarithmic concepts
    b. Utilization of metric system
    c. Decibels
2. Principles of sound waves
    a. Sound variables, frequencies, ultrasound, and principles of wave propagation
    b. Interaction of sound in various media
3. Sound beam characteristics
    a. Huygens' principle
    b. Range equation
    c. Beam intensities and divergence
    d. Resolution focusing on axial and lateral resolution
4. Display modes
    a. A-mode, B-mode, and M-modes
    b. Power settings in relation to ALARA

Lab Content

Not applicable.

Special Facilities and/or Equipment

DVD/TV, internet access, computer, monitor.

Method(s) of Evaluation

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

Written quizzes
Midterm
Comprehensive final

Method(s) of Instruction

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

Lecture presentations
Classroom discussions
Content reinforcement

Representative Text(s) and Other Materials

Edelman, Sidney. Understanding Ultrasound Physics. 2018.

Although this text is older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

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