

**BERGEN COMMUNITY COLLEGE
DIVISION OF HEALTH PROFESSIONS
DIAGNOSTIC MEDICAL SONOGRAPHY PROGRAM**

DMS 201 Ultrasound Physics II

1 lec., 3 lab., 2 Credits (4 hours)

Prerequisite: DMS 101; DMS 102; DMS 113; DMS 115

COURSE DESCRIPTION: Ultrasound Physics II is a course that provides an in-depth study of the characteristics of ultrasound and its interaction with tissue by reflection, refraction, and absorption. Topics covered include Doppler ultrasound, image artifacts, ultrasound bioeffects, safety, quality assurance, and advances in ultrasound.

GENERAL COURSE OBJECTIVES: At the completion of the course the student will be able to:

- Differentiate between different transducer designs and understand their capabilities and limitations.
- Discuss the safety and bioeffects of medical ultrasound.
- Explain Doppler ultrasound, spectral analysis, and Color Flow Doppler.
- Describe methods used in ultrasound machine calibration.
- Check the accuracy of ultrasound equipment using various test objects.
- Identify specific sonographic artifacts and variants, and explain why and how they occur.
- Describe current research leading to future developments in ultrasound.

ASSESSMENT: Knowledge of course objectives will be assessed by verbal questions prior to, and at the end of each class, quizzes, tests, and lab worksheets.

TEXTBOOK REQUIRED: Kremkau, Frederick; Diagnostic Ultrasound; Principles and Instruments, Eighth Edition, W.B.Saunders Co., Philadelphia, 2011.

NUMERICAL GRADE CALCULATION

Lab assignments	10%
Quiz average**	25%
Test average**	30%
Final exam	35%

FINAL GRADE CALCULATION

92 – 100	A
88 – 91.9	B+
83 – 87.9	B
79 – 82.9	C+
75 – 78.9	C
0 – 74.9	F

All grades are absolute and will not be rounded off.

A student may only make up a test or quiz only if the absence is due to **personal illness. All quizzes must be made up in the Testing Center within **one week of absence**. Any quiz not made up in the allotted time will be given a grade of zero. A physicians note must be submitted for an absence on a scheduled test day. THERE WILL BE NO EXCEPTIONS TO THIS POLICY. In addition, hands-on labs cannot be made up.

LECTURE SCHEDULE

Lecture 1	Transducers
Lecture 2	Scanning Speed Limitations
Lecture 3	Measurements of Intensity
Lecture 4	Intro to Bioeffects Mechanisms of Ultrasound
Lecture 5	TEST #1
Lecture 6	Hemodynamics
Lecture 7	No Class
Lecture 8	Doppler Ultrasound
Lecture 9	Doppler Ultrasound, con't Spectral Analysis
Lecture 10	Color Doppler
Lecture 11	TEST #2
Lecture 12	Test Objects and Tissue Equivalent Phantoms
Lecture 13	Artifacts and variants
Lecture 14	Harmonics and 3D Ultrasound
Lecture 15	FINAL EXAM (cumulative)