



BAKER COLLEGE
STUDENT LEARNING OUTCOMES

HSC1810 Acoustical Physics
4 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Examine sound wave characteristics and properties.
 - a. Recognize the basic ultrasound properties and terminology.
 - b. Distinguish types of sound wave propagation through tissue.
 - c. Describe general principles of metric notation, unit conversion, and measurements.

2. Explain transducer technology.
 - a. Identify transducer components.
 - b. Determine the advantages and limitations of the various transducers.

3. Explain the features of medical sonographic equipment.
 - a. Relate operator controls to image processing.
 - b. Explain the Doppler block diagram.

4. Examine the role of advanced scanning features and artifacts.
 - a. Describe harmonics, coded excitation, and compounding.
 - b. Recognize image artifacts and techniques to minimize or eliminate them.

5. Explain the principles of the Doppler Effect.
 - a. Describe color, power, and spectral flow imaging
 - b. Explain the Doppler equation.
 - c. Differentiate pulsed wave Doppler from continuous wave Doppler.
 - d. Explain hemodynamics.

6. Explain the importance of performance, safety, and output measurements and bioeffect standards.
 - a. Examine sonographic image and Doppler spectral quality, and recognize the importance of preventative maintenance of the ultrasound system.
 - b. Discuss the biological effects associated with the use of medical sonography.
 - c. Relate the As Low as Reasonably Achievable (ALARA) principle.
 - d. Differentiate the various types of imaging phantoms and test objects.
 - e. Explain the importance of quality assurance and test validation.

Big Ideas and Essential Questions

Big Ideas

- Sound Wave Behavior
- Transducer Components
- Image Processing
- Harmonics and Artifact
- Doppler Effects
- Biological Effects

Essential Questions

1. What would distinguish the types of sound wave propagation through different mediums?
2. When do we modify operator controls to reduce artifact in the imaging process?
3. Why do we differentiate color, power, and spectral flow imaging in relation to pulse wave and continuous wave?

These SLOs are not approved for experiential credit.

Effective: Summer 2023