

University of Arkansas - Fort Smith
5210 Grand Avenue
P. O. Box 3649
Fort Smith, AR 72913-3649
479-788-7000

General Syllabus

ISS 3212 Acoustical Physics and Instrumentation II

Credit Hours: 2 Lecture Hours: 2 Laboratory Hours: 0

Prerequisite: ISS 3103 Acoustical Physics and Instrumentation I

Corequisites: ISS 3203 Abdominal Sonography I, ISS 3213 Clinical Practice I, and ISS 3223 Vascular Sonography I

Effective Catalog: 2018-2019

I. Course Information

A. Catalog Description

Continues the exploration into the interactions of ultrasound production and display, various transducer designs and construction, quality assurance/control, bioeffects, image artifacts, techniques for recording static and dynamic images, methods of color flow, the Doppler principles, and hemodynamics.

B. Additional Information - None

II. Student Learning Outcomes

A. Subject Matter

Upon successful completion of this course, the student will be able to:

1. Categorize the primary components of sonographic instruments and the functions of each.
2. Analyze how pressure and resistance affect flow.
3. Evaluate the various kinds of flow encountered in blood circulation.
4. Assess the Doppler effect, the Doppler shift, and the Doppler angle.
5. Justify how the Doppler shift for a moving reflector depends on frequency and reflector motion.
6. Decide how two-dimensional flow information is color-encoded on a sonographic display.
7. Connect the Doppler shift and Doppler power display.

8. Propose why sonographic gray-scale images can present anatomic structures incorrectly.
9. Deduce how specific artifacts can be recognized.
10. Categorize the devices that are available for testing various performance characteristics of instruments.
11. Support what is known regarding risk in the use of sonography or Doppler ultrasound.
12. Outline the effects of ultrasound in living tissue.

B. University Learning Outcomes

This course enhances student abilities in the following areas:

Analytical Skills

Critical Thinking Skills: Students will use analytical/critical thinking skills to draw conclusions and/or solve problems. Students will think critically to reach viable solutions to a problem and justify those solutions when faced with image artifacts and appropriate Doppler signals.g

Quantitative Reasoning: Students will represent mathematical/statistical information symbolically, visually, numerically and verbally and will interpret models and data in order to draw inferences.

III. Major Course Topics

- A. Scanning Technology
- B. Imaging Instrumentation
- C. Transducers
- D. Doppler Effects
- E. Color-Doppler Instruments
- F. Spectral-Doppler Instruments
- G. Artifacts
- H. Performance and Safety