

**University of Arkansas - Fort Smith**  
**5210 Grand Avenue**  
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**Fort Smith, AR 72913-3649**  
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### **General Syllabus**

#### **DMSO 32102 Acoustical Physics and Instrumentation II**

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

Prerequisite: DMSO 31003 Acoustical Physics and Instrumentation I

Corequisites: DMSO 32003 Abdominal Sonography I, DMSO 32103 Clinical Practice I, and DMSO 32203 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.

**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