

# Course Competency

## SON 2618C Acoustical Physics and Instrumentation 2

### Course Description

Physical principles of Ultrasound Instrumentation-A course designed to familiarize the student with the physical principles and modes of operation of diagnostic ultrasound equipment. Subject matter includes: transducers, display systems, component parts of a scanning system, real-time scanners, Doppler equipment, quality control, routine maintenance and recent developments. Prerequisites: SON 2614C, CGS 1060.

Course Competency	Learning Outcomes
<b>Competency 1:</b> The student will demonstrate knowledge and comprehension of properties of sound by:	1. Critical thinking
<ul style="list-style-type: none"> <li>a. Listing different acoustic variables.</li> <li>b. Defining, and differentiating different acoustic variables.</li> <li>c. Reviewing and discussing competencies of basic sonography</li> </ul>	
<b>Competency 2:</b> The student will demonstrate knowledge and comprehension of sound beams by:	1. Critical thinking
<ul style="list-style-type: none"> <li>a. Identifying and describing the components of a sound beam.</li> <li>b. Differentiating between Near Zone and Far zone.</li> <li>c. Discussing Focal Depth</li> <li>d. Explaining sound beam divergence.</li> <li>e. Defining types of waves.</li> <li>f. Explaining Huygen’s Principle.</li> <li>g. Explaining lateral resolution, its units, and by what it is determined.</li> <li>h. Discussing focusing.</li> <li>i. Differentiating types of focusing.</li> </ul>	
<b>Competency 3:</b> The student will demonstrate knowledge and comprehension about resolution by:	1. Critical thinking

<ul style="list-style-type: none"> <li>a. Explaining axial resolution and lateral resolution.</li> <li>b. Demonstrating how the controls can improve axial resolution.</li> <li>c. Explaining the association with frequency, pulse duration, pulse length and resolution</li> </ul>	
<p><b>Competency 4:</b>The student will demonstrate knowledge and comprehension of Intensity by:</p>	<p>1. Critical thinking</p>
<ul style="list-style-type: none"> <li>a. Defining intensity.</li> <li>b. Defining spatial peak intensity.</li> <li>c. Defining temporal peak intensity.</li> <li>d. Combining spatial and temporal factors. Explaining the measurement methods of intensity.</li> <li>e. Explaining the intensity and relating this to bioeffects of diagnostic ultrasound.</li> </ul>	
<p><b>Competency 5:</b>The student will demonstrate knowledge of bioeffects by:</p>	<p>1. Critical thinking</p>
<ul style="list-style-type: none"> <li>a. Review AIUM guidelines and statements about bioeffects.</li> <li>b. Discussing the difference between therapeutic ultrasound and diagnostic ultrasound.</li> <li>c. Describing sound energy conversion into heat.</li> <li>d. Discussing study techniques of bioeffects.</li> <li>e. Listing and defining and the mechanisms of bioeffects.</li> <li>f. Discussing overall safety considerations in diagnostic medical sonography</li> </ul>	

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