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Course Description
SON2619C | Doppler Principles and Instrumentation | 2.00 credits
This course presents a review of fundamental physics and an in-depth study of Doppler Physical Principles of Diagnostic Ultrasound. Topics also include Doppler Instrumentation, equipment, display systems, quality control, and hemodynamics of blood flow. Prerequisite: SON2618C.

Course Competencies
Competency 1: The student will demonstrate knowledge and comprehension of how basic principles of physics apply to Doppler by:
1. Defining the pulse repetition frequency
2. Analyzing when to change the pulse repetition frequency
3. Describe the functions of each Doppler
4. control and how it changes the sound pulses being sent and reflected
5. Defining the Doppler shift
6. Describing the spectral trace Doppler and average velocities and waveforms

Competency 2: Demonstrate knowledge and comprehension of the hemodynamics of the body by:
1. Explaining laminar flow and name
2. conditions when it will exist
3. Describe how spectral broadening can occur even in a vessel with laminar flow
4. Differentiate parabolic from flat velocity profiles
5. Name three (3) situations where turbulence will occur

Competency 3: Demonstrate knowledge and comprehension of Doppler study performance by:
1. Explaining the importance of angle in determining the Doppler shift
2. Indicating what conditions will result in a higher or lower blood flow velocity
3. Stating the modified Bernoulli equation and calculating several pressure gradients
4. Explaining when pressure gradients exist
5. Performing a pressure half-time measurement on a mitral valve flow signal

Competency 4: Demonstrate knowledge and comprehension of blood flow patterns by:
1. Describing the characteristic flow of the aortic, mitral, tricuspid, and pulmonic valves
2. Naming three (3) characteristics of regurgitant jets
3. Calculating the systolic pressure in the RV when given TR signals
4. Relating the severity of AI to the slope of the signal
5. Name four (4) characteristics of stenotic flow

Learning Outcomes:
- Communicate effectively using listening, speaking, reading, and writing skills
- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information
- Use computer and emerging technologies effectively