ECHO1125 - Ultrasound Physics and Instrumentation II

Credits:	3 (3/0/0)
Description:	This course continues exploration of the theoretical and abstract principles that form the technological basis of diagnostic medical sonography. Topics include Doppler physics and instrumentation, artifacts, quality assurance and hemodynamics. Physics applications and collaborative learning will be highly emphasized.
Prerequisites:	• ECHO1100 • ECHO1105 • ECHO1120
Corequisites:	• ECHO1110 • ECHO1115
Pre/Corequisites*:	
Competencies:	1. Explain how the primary components of a sonographic system work. 2. Analyze and describe axial, lateral, temporal, elevational, spatial and contrast resolutions pertaining to the diagnostic quality of an ultrasound image. 3. Differentiate between Doppler effect, Doppler shift, and Doppler angle and calculate the Doppler shift using different speed and frequencies. 4. Differentiate and interpret the types of hemodynamic flow encountered in blood circulation and explain the influence of pressure and resistance on blood flow in the body. 5. Differentiate and classify two-dimensional and Doppler artifacts and how to correct them. 6. Analyze the effect of stenosis on blood circulation and predict flow characteristics before and after the stenosis. 7. Differentiate between exam objects and exam phantoms and explain how they are used for examining various performance characteristics of instruments. 8. Analyze the effect of excessive output power and explain relevant concepts about ultrasound bioeffects in cells, animals and humans. 9. Analyze and implement the ALARA (As Low As Reasonably Achievable) principle and list the necessary steps to avoid unreasonable exposure to ultrasound. 10. Apply the concepts of ultrasound physics in the production of diagnostic sonographic images. 11. Analyze and differentiate the different types of Doppler applications: Color, Power and Spectral. Define hue, saturation and luminance. 12. Describe how images are stored electronically and compare signal processing and image processing. 13. Analyze preprocessing and postprocessing in sonography.
MnTC goal areas:	None

Can be taking as a Prerequisite or Corequisite.