CVT A190: INTRODUCTION TO SONOGRAPHY AND IMAGING PHYSICS

Item	Value
Curriculum Committee Approval Date	09/04/2024
Top Code	121300 - Cardiovascular Technician
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

Introduction to ultrasound physics & instrumentation for cardiac ultrasound, visualized on 2-dimensional and 3-dimensional ultrasound imaging. PREREQUISITE: CVT A160. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. The student will identify the basic principles of image production in sonographic physics in cardiovascular imaging.

Course Objectives

- 1. Identify instrument adjustments to acquire a 2- dimensional cardiac image with sonography.
- 2. Correlate the physics of sonographic and instrumentation with image production in cardiac and vascular imaging.
- 3. Discuss basic principles of sonographic physics and image production.
- 4. Integrate cardiac anatomy with sonographic anatomy.
- 5. Demonstrate basic understanding of image acquisition of cardiac anatomy sonographically.

Lecture Content

COURSE OBJECTIVES: 1. Identify basic principles of sonographic physics and image production. 2. Identify anatomical cardiac structures seen on 2- dimensional sonographic images. 3. Correlate the physics of sonographic physics instrumentation with image production in cardiovascular. 4. The student will identify instrument adjustments to acquire a 2- dimensional cardiac image with sonography. 5. Integrate cardiac anatomy with sonographic anatomy. COURSE CONTENT: Course introduction: sonography, ultrasound physics and instrumentation. Review of heart and vessel anatomy Review of the pathological process for the heart and blood vessels Ultrasound physics and instumentation terminology for image production Ultrasound physics and instrumentation relating to normal cardiac and blood vesel sructures. Cardiac anatomy terminology for 2- dimensional images. Cerebral Vascular terminology for 2- dimensional images. Imaging portfolio construction of normal and pathological processes found in the heart and blood vessels.

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)

Instructional Techniques

Lecture Demonstrations Hands-on instrumentation manipulation

Reading Assignments

Students will spend approximately 2 hours per week on reading assignments, including the following: Read assigned chapters from course text. Read and review course subject terminology Read and review course handouts.

Writing Assignments

Students will spend approximately 2 hours per week on written assignments, including: Complete weekly terminology assignments. Write weekly progress evaluations. Written discussion regarding the image acquisitions

Out-of-class Assignments

Students will spend approximately 3-4 hours per week on reading and written assignments, and out-of-class assignments including: Search and read internet articles related to ultrasound physics instrumentation. Review required images. Review course materials for course test and examinations.

Demonstration of Critical Thinking

Identify anatomical cardiovascular structures from printed examples. Identify instrumentation adjustments needed to produce anatomical images. Correlate image production to diagnostic image quality.

Required Writing, Problem Solving, Skills Demonstration

Compile written evaluations of instrumentation adjustments for optimal imaging. Self-evlauation and reflection.

Eligible Disciplines

Cardiovascular technology: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Edelman, S.K.. Understanding Ultrasound Physics, fourth ed. Woodlands: ESP, Inc, 2012 Rationale: Textbook has introductory principles. It be used in subsequent classes in the CVT Program. Universal text used ultrasound physics lecture. This is the current text available.