

SPRINGFIELD TECHNICAL COMMUNITY COLLEGE

ACADEMIC AFFAIRS

Course Number: DMDS 100 Department: Diagnostic Med. Sonography

Course Title: Physics & Instrumentation 1 Semester: Spring Year: 1997

Objectives/Competencies

Course Objective	Competencies
1. Sound/Ultrasound	<ol style="list-style-type: none">1. Define sound and ultrasound and describe the differences.2. Describe the relationship between sound and ultrasound and the electromagnetic spectrum.3. Describe the range of sound and ultrasound frequencies.4. Recognize the common frequencies used in sonography and their uses.5. Define acoustic variable and describe how each relate to Diagnostic Medical Sonography.6. Define velocity and describe the factors that determine it.7. Define and calculate amplitude, wavelength, period and frequency.8. Describe the relationship between velocity, frequency and wavelength.9. Describe the relationship between frequency and penetration.10. Describe and recognize interaction of sound with tissue.11. Using a sound meter, locate and measure the effects of interface.12. Define and calculate the intensity reflection coefficient.

Course Objective	Competencies
<p>4. Computer Technology/Signal Processing</p>	<ol style="list-style-type: none"> 1. Explain equipment related to the signal production process. 2. Describe the signal reception process. 3. Explain amplification and describe its application. 4. Explain filtering and describe its application. 5. Outline the RF to single voltage process. 6. Explain the various methods of signal detection. 7. Draw, label and explain the various components of a CRT. 8. Describe and adhere to all safety precautions related to CRT's and related CRT devices. 9. Explain creation and purpose of A, B & M-mode. 10. Explain dynamic range and importance to DMS. 11. Define "noise" and list various methods of cause and control.
<p>5. Use of Typical Controls/Instrumentation Types</p>	<ol style="list-style-type: none"> 1. Define "analog" and "digital" and application. 2. Recognize analog versus digital signals. 3. Describe what an A/DC and a D/AC does and relate use. 4. Define bit, byte, kilobyte, megabyte, CPU, memory, storage, input, output, processing and pixel. 5. Define and explain software. 6. Develop and ally a basic algorithm. 7. List and explain preprocessiing and postprocessing methods. <ol style="list-style-type: none"> 1. List and explain the use of the various controls used for signal manipulation to include: amplification, filters (electronic and mechanical) reject, power, focusing, and

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6.	<p>processing.</p> <ol style="list-style-type: none"> 2. Provide lab equipment and test objects, use typical signal manipulation controls to produce “zero defect” images. 1. Diagram, label and explain the components of a static nit. 2. Diagram, label and explain the components of a typical mechanical realtime unit. 3. Diagram, label and explain the components of a typical phased array realtime unit.