

# Principles of Servicing Ultrasound Systems (2.5 Days)



RADIOLOGICAL SERVICE TRAINING INSTITUTE

## Introduction

This course covers the principles of ultrasound with specific focus on maintenance. Please call for the specific machines used in this class.

## Prerequisites

To attend this course, the service professional must possess fundamental knowledge and understanding of basic electronics.

## Objectives

At the completion of this course, participants will be able to:

- Demonstrate an understanding of the physics of sound
- Demonstrate an understanding of basic ultrasound theory
- Identify the characteristics of acoustic waves
- Identify various modes of operation
- Describe the parts of a basic ultrasound scanner
- Identify signal flow and label system block diagrams
- Understand image quality as it pertains to ultrasound
- Perform QA checks
- Perform PM checks on various ultrasound machines
- Perform networking and DICOM setup
- Identify probes and their uses

## Course Outline

### Day 1

- Introduction to ultrasound
  - Overview of ultrasound in medicine
  - History
- Physics of sound
  - Sound
  - Wave Propagation
  - Doppler Effect
  - Piezoelectric Effect
- Interactions with Tissues
  - Reflection
  - Refraction
  - Scattering
  - Absorption
  - Diffraction
- Transducers
  - Evolution of Transducers
  - Types of Transducers
  - Image Formats
  - Construction
  - Beam Formation
- Modes of operation
  - 2D-mode
  - M-mode
  - Doppler
    - Color
    - Spectral

### Day 2

- Clinical Applications
  - Radiology
  - Cardiology
  - Vascular

- OB/GYN
- Basic ultrasound scanner and controls
  - System block diagram
    - Beam former
    - Transmitter
    - Receiver
    - Scan conversion
    - Output
    - Power
  - Basic scanning of the body
- Image Quality
  - Axial resolution
  - Lateral resolution
  - Dynamic range
  - Sensitivity
  - SNR
- Ultrasound connectivity
  - Networking configuration
  - PACS & DICOM configuration
  - DICOM/Output verification
  - Ultrasound connectivity troubleshooting

### Day 3

- Required Tools
- Basic PM Procedures
  - Basic ACR Procedures
  - Probe maintenance
    - Probe handling
    - Probe cleaning
    - Probe disinfecting
  - Software Requirements
- Common Probe Failures
- Basic Ultrasound Troubleshooting