

Multi-Vendor Mammography: GE DMR+, 800T, Lorad MIV Platinum™, & Siemens Mammomat 3000 Nova



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Introduction

This course is going to cover the Laws, Regulations, Calibration, Service, Troubleshooting & QA of multiple vendor's mammographic equipment. Given today's regulatory environment, maintaining the system at peak performance is of the utmost importance. Please check the schedule for equipment used.

Prerequisites

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

Objectives

Upon completion of this course the student will be able to:

- Describe the current mammographic imaging regulatory environment
- Describe the factors that affect mammographic image quality
- Demonstrate an understanding of the accreditation process
- Describe how those factors are optimized to produce the highest quality mammographic images
- Demonstrate an understanding of the Mammographic Quality Standards Act
- Given various manufacturer's systems be able to:
- Demonstrate an understanding of calibration procedures associated with various mammo equipment

- Perform the necessary tests to reproduce the results of the physicist's report to confirm corrective action
- Perform all system calibrations and adjustments to maintain the highest quality images and compliance with MQSA requirements
- Evaluate circuit functions to facilitate troubleshooting

Course Outline

Day 1

- Mammography process overview
- Basic terminology
- Positioning and technique
- Screening vs clinical
- Lab Activities
 - o Dark room conditions
 - o Sensitometric properties
 - o Photographic density
 - o Characteristic curves
 - o Screen considerations
 - o Processing

Day 2

- Factors affecting image quality
- ACR Mammography Accreditation Program
- Quality assurance in mammography
- Lab Activities
 - o Collimation
 - o Compression devices
 - o Bucky/grid devices
 - o AEC tracking
 - o Focal spot geometry

- o Phantom images

Day 3

- Troubleshooting image quality problems
- Mammography quality control, beyond the basic
- 1999 Mammography Quality Standards Act (MQSA)
- Lab Activities
 - o kVp
 - o HVL
 - o Linearity
 - o Reproducibility
 - o Glandular dose
 - o Radiation safety

Day 4

- Introduction to systems
- System specifications
- Operation
- System controls
- Physical layout
- Using documentation
- Using software
- Lab Activities
 - o Component location
 - Schematic location
 - Physical location
 - Connector locations
 - Fuse location/identification
 - o Cover removal procedures
 - o Locating ID/Compliance labels
 - o Parts identification

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Day 5

- Turn-on circuits
- Power distribution
- System block diagrams
- Lab Activities
 - o Input AC voltage adaptation
 - o Power supply verification
 - AC supplies
 - DC supplies

Day 6

- kV control
 - o Manual kV
 - o Auto kV
- HV secondary
 - o Feedback circuits
 - o Safety circuits
 - o Overload detect
- mA control
 - o Manual kV
 - o Auto kV
- Filament drive circuits
 - o Filament control
 - o Filament protect
 - o Grid bias
- Lab Activities
 - o kV measurement
 - A. Invasive
 - B. Non-invasive
 - o Safety/overload circuits
 - o Waveform analysis
 - o kV calibration
 - o mA/mAS measurement

- o Filament drive waveform analysis
- o mA waveform analysis
- o mA/tube heater calibration
 - Manual kV
 - Auto kV
 - Grid bias calibration

Day 7

- Rotor control
 - o Inverter drive
 - o Rotor status checks
- Exposure control
 - o Manual
 - o AEC
- Patient data system
- Monitor
- Lab Activities
 - o AEC calibrations
 - Optical density
 - Thickness compensation
 - HTC™ compensation
 - Grid compensation
 - kV tracking
 - Photocell
 - o Rotor control
 - o Rotor verification
 - o Rotor waveform analysis

Day 8

- Electromechanical systems
 - o Tube support area
 - o Gantry drive area
 - o Film support area
- Lab Activities
 - o Thickness calibration
 - o Compression force calibration
 - o Filter calibration
 - o Rotation zero calibration

- o Grid calibration
- o Collimator calibration
- o Stereoloc rotation velocity calibration
- o HTC™ thickness threshold

Day 9

- Accessory interfacing
- Tube replacement
- Mechanical adjustments
- Lab Activities
 - o Accessory interface verification
 - o Tube type programming
 - o Collimator calibration
 - o Mirror calibration
 - o System troubleshooting

Day 10

- Course review
- Course evaluation
- Final exam