

# PACS Engineers & Administrators Certification (Phase I)



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## Introduction

The PACS Engineers & Administrator Certification Phase I will teach the clinical and technical skills necessary to understand and analyze today's PACS system administrative challenges. Students will learn digital integration between all systems in the imaging departments including modalities and information management systems. The technical concepts that will be covered will allow students to troubleshoot network hardware, first response software and DICOM related image transfer issues.

## Prerequisites

The seasoned service professional must have a basic understanding of computer fundamentals, be able to navigate windows operating system, and have completed. Students are required to bring their own laptop

## Objectives

Upon completion of the course participants will be able to:

- Perform day-to-day network hardware maintenance
- Manage department security and patient record confidentiality
- Demonstrate understanding of architecture and communication of entire digital imaging networks
- Recognize DICOM and software related image displays and transmission problems

## Course Outline

### Day 1

- Hardware
  - Dedicated processing
  - Disk technology
  - Reliability
  - Redundancy
- Lab Activities
  - Configure & Build RAID Array using test server

### Day 2

- Operating systems
  - Unix
    - File system
    - Permissions
    - Viewing & editing files
  - DOS
  - Windows

### Day 3

- Databases
  - SQL
- Data representations
  - Binary/Hex
  - Signed/Unsigned/Floating Point
  - Monochrome/RGB
- Lab Activities
  - Install and build SQL database
  - SQL queries
  - SQL joins

### Day 4

- Networking technology

- Topologies
- Hardware
- OSI model
- Bandwidth
- Ethernet, TCP/IP
  - Addressing
  - Routing
  - Subnetting
    - Lay out hospital subnets
    - Hardware for best performance
  - FTP
  - Configuration
  - TCP packet analysis
  - Troubleshooting
- Monitoring performance

### Day 5

- Security concepts
  - Authentication
  - Authorization
  - Confidentiality
  - Integrity
  - Encryption
  - User management & access Parameters
  - Monitor audit trails
  - Maintain integrity of patient confidentiality

### Day 6

- PACS overview
  - PACS architecture
  - PACS components
  - Communication
  - Components
    - CR/DR
  - Viewstation/workstation requirements

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## Day 7

- PACS overview (cont'd)
  - Archiving
  - Storage technology
    - DAS/NAS/SAN
    - RAID
    - Exchange media
    - Backup patient demographics and image directories
  - Hospital workflow
    - Digital radiology imaging
    - Image characteristics
    - QA/QC programs
    - Configure image routing and route tables

## Day 8

- PACS overview cont'd
  - Administering exam flow
  - Results reporting
  - Dictation
  - Speech recognition
  - Remote system viewing
- Prior/outside exam handling
  - Film
  - Digitization
  - Import CDÖs

***DICOM Introduction – The following concepts will be introduced, these concepts will be covered in detail in PACS Phase II***

## Day 9

- DICOM introduction
  - DICOM vocabulary
  - Functions of DICOM

- DICOM information model
  - Patient
  - Study
  - Series
  - Image
- DICOM files
- DICOM storage
- DICOM standard
  - DICOM objects
    - Composite
    - Normalized
  - Services
    - SOP classes

## Day 10

- DICOM conformance statements
  - Analyzing conformance statements
  - Requirements
  - Troubleshooting
  - Analyzing facility requirement gaps
- Configuration network modalities
  - Application entities
- DICOM transmission sequence
  - DICOM association
  - DICOM workflow
    - Transfer syntax presentation context
  - DICOM troubleshooting
    - DICOM emulators
    - TCP/IP ping
    - DICOM verification (echo)
    - Send/Receive test messages
    - Modify image headers
    - Image anonymization
  - DICOM image consistency
    - Grayscale standard display function

- RSTI's PACS Engineer & Administrator Phase I Exam

## Labs:

- Windows PACS Server:
  - Assemble Server with RAID Array
  - Configure & Format RAID Array
  - Install Windows OS
  - Install MySQL Database
  - Configure MySQL Database
  - Install Open-Source PACS software
  - Configure Open-Source PACS software
  - Test Open-Source PACS install using various modalities & laptop troubleshooting tools
- Linux PACS Server
  - Assemble Server with RAID Array
  - Configure & Format RAID Array
  - Install Linux OS
  - Install MySQL Database
  - Configure MySQL Database
  - Install Open-Source PACS software
  - Configure Open-Source PACS software
  - Test Open-Source PACS install using various modalities & laptop troubleshooting tools