Data Center Technician Foundations 2 Course Description

Overview

Data Center Technician Foundations 2 is an intermediate-level course designed to build on the foundational knowledge gained in Data Center Technician Foundations 1. This course focuses on developing practical, job-ready skills required for real-world data center operations, field work, and infrastructure lifecycle management.

By the end of this course, learners will be able to demonstrate effective incident ownership and operational response behaviors; perform rack and stack installations following industry best practices; execute safe and compliant hardware decommissioning processes; and operate effectively within a 24/7 data center environment using structured workflows, ticketing systems, and service level agreements (SLAs).

The course emphasizes hands-on operational tasks, professional practices, and real-world scenarios that prepare learners for entry-level and junior data center technician roles.

Available Curriculum Languages:

- English

Duration

- Recommended total course time: 50–60 hours*
- Suggested schedule: 18–24 weeks; 2 sessions/week; 90 minutes/session (≈ 3 instructional hours/week)

*Course time may include instruction, guided practice, labs, simulations, practical exercises, scenario-based learning, and assessments.

Target Audiences

Educators

- Technical, vocational, and community college instructors delivering courses in IT infrastructure, data center operations, or cloud environments.
- Educators supporting learners progressing from foundational IT knowledge to hands-on operational skills.

Students

- Students who have completed Data Center Technician Foundations 1 or have equivalent foundational knowledge.

- Learners seeking practical, job-ready skills for roles in data center operations, field services, or infrastructure support.
- Students interested in operational workflows, hardware lifecycle management, and real-world data center environments.

Prerequisites

Required

- Completion of Data Center Technician Foundations 1 or equivalent knowledge

Suggested

- Basic understanding of Linux, networking fundamentals, and data center concepts
- Familiarity with ticketing systems and basic troubleshooting approaches

Suggested Next Courses

- Linux Web Services
- OCI Compute Virtual Machine

Lesson-by-Lesson Topics and Objectives

Module 1: Lab & Practical Setup

1-1 Lab Preparation (Virtualization & OS Setup):

- Teach how to build a Linux lab using Oracle VirtualBox
- Explain VM setup (Ubuntu, networking, resource sizing)
- Cover NAT vs. host-only networking models
- Introduce baseline configurations (SSH, firewall, updates)
- Provide hands-on practice for setup, validation, and recovery

Module 2: Operating Systems & Administration

2-1 Introduction to Operating Systems and Linux Environment:

- Define what an operating system is and its core responsibilities (kernel, shell, file system, process management)
- Introduce Linux and its importance in data centers and OCI environments
- Teach command-line navigation (cd, ls, pwd) and command structure
- Cover file operations, text handling, and safe editing practices
- Explain file permissions (rwx), ownership, and security concepts

2-2 Shell Mastery:

- Explain why the Linux shell is critical for administration, automation, and troubleshooting
- Introduce globbing, regex, and safe command usage
- Teach streams (stdin, stdout, stderr), pipes, and redirection
- Cover command chaining, exit codes, and scripting basics
- Introduce file searching and filtering using tools like find and grep

2-3 Process Administration, Remote Access, and Log Analysis:

- Explain system monitoring concepts (CPU, memory, disk, processes)
- Teach how to identify and troubleshoot performance issues
- Introduce system logs, kernel messages, and log analysis techniques
- Cover SSH fundamentals, key-based authentication, and security best practices
- Provide troubleshooting approaches for SSH and system issues

2-4 Linux Administration Basics:

- Explain the importance of patching for security, stability, and compliance

- Teach a standard patch/update workflow (update, upgrade, reboot, verify)
- Introduce best practices for safe and repeatable maintenance cycles
- Cover post-patch validation (network, SSH, services)
- Reinforce documentation and change management principles

2-5 Firewall Basics:

- Define firewalls and their role in reducing attack surface
- Teach Linux firewall management using ufw
- Explain default deny/allow policies and least-privilege networking
- Cover safe configuration practices to avoid lockouts
- Reinforce operational best practices and rule verification

Module 3: Linux Systems

3-1 Linux Process Management:

- Define what a process is and explain lifecycle and states
- Teach process monitoring using ps, top, and related tools
- Cover process control (kill, pkill, signals)
- Explain background vs. foreground jobs and job control
- Introduce nohup for persistent processes

3-2 Linux Boot Process:

- Explain file system types (ext4, xfs, etc.) and their role in system operation
- Teach how Linux identifies and mounts file systems (fstab, lsblk, blkid)
- Cover boot sequence (BIOS/UEFI → GRUB → kernel → systemd)
- Introduce systemd targets and recovery modes
- Explain common boot failures and troubleshooting methods

Module 4: Networking Fundamentals

4-1 Networking Fundamentals:

- Introduce OSI and TCP/IP models and their role in troubleshooting
- Explain MAC vs. IP addressing and ARP functionality
- Teach how to identify issues at different network layers
- Cover key tools (ip, ping, tcpdump, traceroute)
- Introduce neighbor tables and ARP failure scenarios

4-2 TCP vs. UDP:

- Explain differences between TCP (reliable) and UDP (connectionless)
- Teach TCP connection process (3-way handshake)
- Cover ports, sockets, and service communication
- Introduce IPv4/IPv6 addressing and subnetting basics
- Explain public vs. private IP addressing and NAT concepts

4-3 Switching Concepts:

- Explain how switches forward traffic using MAC addresses
- Introduce CAM tables and MAC learning
- Define broadcast domains and VLAN segmentation
- Explain switching behavior (unicast, broadcast, flooding)
- Introduce STP and loop prevention concepts

4-4 Routing:

- Define routing and the role of routers in networks
- Explain default gateway and routing table decisions
- Teach longest prefix match and packet forwarding logic
- Cover IP forwarding and NAT basics
- Introduce troubleshooting tools (traceroute, tcpdump)

4-5 Data Center Network Design:

- Compare traditional 3-tier vs. modern leaf-spine architectures
- Explain east-west vs. north-south traffic patterns
- Introduce redundancy models (N+1, ECMP)
- Cover oversubscription and performance considerations
- Explain failure domains and scalability in data centers

Module 5: Power & Cooling

5-1 Electrical Power Systems in Data Centers:

- Explain end-to-end power flow (grid → UPS → generators → PDUs → servers)
- Introduce A/B power redundancy and fault tolerance
- Teach correct PSU cabling and common failure scenarios
- Cover single-phase vs. three-phase power concepts
- Reinforce safety, monitoring, and operational best practices

5-2 Cooling Systems for Data Center Technicians:

- Explain why cooling is critical for uptime and hardware reliability

- Introduce airflow principles and hot/cold aisle design
- Cover containment strategies and cooling systems (CRAC/CRAH)
- Teach rack hygiene (blanking panels, cable management)
- Explain temperature monitoring, alerts, and incident response

Module 6: Job Role & Operations

6-1 Incident Ownership:

- Understand true incident ownership
- Identify severity levels (SEV1–SEV3)
- Apply correct behavior based on severity
- Make escalation decisions
- Communicate effectively under pressure

6-2 Hardware Decommissioning Lifecycle

- Plan and execute hardware decommissioning
- Safely remove equipment from racks
- Understand data sanitization methods
- Update asset records accurately
- Package and dispose of hardware correctly

6-3 Rack & Stack Operations

- Receive and inspect data center equipment
- Prepare racks for installation
- Install rails and mount servers correctly
- Perform power and network cabling
- Validate hardware safely
- Hand off systems to provisioning teams

6-4 Data Center Operations & Professional Practice

- Understand shift-based operations (24/7/365)
- Perform effective shift handovers
- Work within SLA-driven environments
- Prioritize tasks under pressure
- Demonstrate professional behavior in operations