

Course Outline: CCTV Installation & System Management

Course Overview

- Target Audience: Absolute beginners, security technicians, and IT support individuals.
- Format: 20% Theory, 80% Practical Hands-on Installation & Configuration.
- Goal: Install, wire, configure, and manage both traditional Analog and modern IP camera systems.

Module 1: Introduction to CCTV Systems & Camera Types

- CCTV Fundamentals: How a video surveillance system works from lens to monitor.
- Form Factors: Understanding Dome, Bullet, PTZ (Pan-Tilt-Zoom), and Turret cameras.
- Choosing the Right Camera: Resolving field of view, focal length (lenses), and night vision (IR/LED).
- Hands-on Lab: Unboxing different camera types, identifying components, and selecting the correct camera for various indoor/outdoor scenarios. [11, 12, 13, 14, 15]

Module 2: Cables, Connectors & Power Supply

- Analog Cabling: Working with Coaxial cables (RG59/RG6) and BNC connectors.
- IP Cabling: Working with Cat5e/Cat6 ethernet cables and RJ45 crimping.
- Powering Cameras: Understanding 12V DC / 24V AC power supplies, power distribution boxes, and Power over Ethernet (PoE).
- Hands-on Lab: Cutting, stripping, and crimping RJ45 network cables and terminating BNC connectors with video baluns. [16, 17, 18, 19, 20]

Module 3: Storage & Recording Devices (DVR vs. NVR)

- DVR Systems: Digital Video Recorders for traditional analog systems.
- NVR Systems: Network Video Recorders for modern IP-based systems.
- Storage Calculation: Calculating hard drive space needed based on resolution, frame rate (FPS), and retention days.
- Hands-on Lab: Installing a surveillance-grade hard drive into a physical DVR/ NVR and configuring recording schedules (Continuous vs. Motion Detection). [21, 22, 23, 24, 25]

Module 4: IP Camera Networking & Configuration

- IP Addressing for CCTV: Assigning static IP addresses to cameras and NVRs.
- Web Interface Management: Accessing a camera directly via a web browser to adjust image settings.
- Onvif Compliance: Understanding how to mix and match different camera brands with one NVR.
- Hands-on Lab: Connecting an IP camera to a PoE switch, discovering its IP address, and successfully adding it to an NVR interface.

Module 5: Remote Viewing & Network Integration

- Router Configuration: Basic port forwarding and DDNS (Dynamic DNS) setup.
- Cloud P2P Technology: Setting up easy mobile viewing using QR codes.
- Integrating with NMS: Adding the NVR and IP cameras to basic network monitoring tools to track up/down status.
- Hands-on Lab: Configuring a mobile application (e.g., Hik-Connect, Dahua DMSS) on a smartphone to view live video feeds remotely.

Module 6: Basic Troubleshooting & Maintenance

- Common Video Issues: Diagnosing video loss, blurry screens, rolling lines, and night vision failure.
- Network Troubleshooting: Fixing IP conflicts and offline camera alerts.
- Physical Maintenance: Cleaning lenses, checking outdoor weatherproofing, and testing backup power (UPS).
- Hands-on Lab: *Fault-Finding Drill*—The instructor disconnects a power cable or changes an IP address, and the student must use NMS/multimeters to find and fix the issue.

Final Practical Assessment: Complete System Deployment

Students will work in small teams to mount a camera, run the appropriate cabling (Ethernet or Coaxial) to a recording station, configure the NVR/DVR, set up motion detection alerts, and display the live feed on both a local monitor and a mobile device.

