# CompTIA A+ Computer Hardware Labs

Teacher Edition  
Genesee Career Institute

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# Lab Sequence Overview

Core 1 – Hardware & Networking: Labs 1–10  
Core 2 – Operating Systems & Security: Labs 11–15

Below is a concise overview of each lab with its focus and expected student outcomes.

## Lab 1 — Tool Familiarization & ESD Safety

Identify and safely use technician tools, ESD gear, and safety procedures.

## Lab 2 — Internal PC Components & Ports Identification

Identify motherboard sockets, RAM, storage interfaces, and power connectors.

## Lab 3 — Assembling a Desktop Computer

Full PC build from parts; verify POST and BIOS/UEFI detection.

## Lab 4 — BIOS/UEFI Configuration & Firmware Updates

Navigate UEFI, set boot order, enable virtualization, update firmware.

## Lab 5 — Storage Device Installation & Configuration

Install SATA and NVMe drives; partition, format, and verify functionality.

## Lab 6 — Memory & CPU Installation and Testing

Seat and test RAM modules, install CPU and cooling solution.

## Lab 7 — Power Supply Testing & Cable Management

Test voltages with a multimeter; verify PSU wattage and proper routing.

## Lab 8 — Peripheral & Printer Setup

Install and configure wired/wireless printers, input, and output devices.

## Lab 9 — Networking & Cable Creation

Crimp RJ-45 cables, build a small LAN, configure IP settings, and test.

## Lab 10 — Mobile Device Disassembly & Maintenance

Open a laptop or tablet safely; identify internal components and perform cleaning or RAM/SSD replacement.

## Lab 11 — Operating System Installation (Windows and Linux)

Install, update, and verify dual-boot or virtual OS environments.

## Lab 12 — System Configuration & User Account Management

Manage accounts, permissions, startup services, and recovery tools.

## Lab 13 — System Maintenance & Performance Monitoring

Use Task Manager, Event Viewer, and maintenance utilities to monitor and tune systems.

## Lab 14 — Security Hardening & Malware Removal

Configure antivirus, firewall, encryption, and practice safe malware removal steps.

## Lab 15 — Capstone – PC Build & Troubleshooting Challenge

Simulate hardware and OS faults; students diagnose, repair, and document their process.

# Master Materials List (By Type)

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| ESD mat and wrist strap | 1 | 5 |
| Screwdriver set | 1 | 5 |
| Cable tester | 1 | 2 |
| Multimeter | 1 | 2 |
| Sample PC components | Set | 5 |

# Lab 1 – Tool Familiarization & ESD Safety

Identify and safely use technician tools, ESD gear, and safety procedures.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Introduce students to common technician tools, safety procedures, and electrostatic discharge (ESD) prevention techniques.

## Learning Objectives

* Identify and safely use technician tools
* Demonstrate proper ESD grounding
* Complete an ESD safety checklist

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| ESD wrist strap | 1 per student | 15 |
| Technician tool kit (screwdrivers, pliers) | 1 per student | 15 |
| Safety goggles | 1 per student | 15 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Review ESD theory and hazards. Demonstrate proper grounding and strap usage. Identify common technician tools and safe usage. Complete the ESD safety checklist worksheet. | Quick Check (Short Answer):  *Exemplar: Always wear an ESD strap and connect it to a grounded point before handling components.*  Applied Scenario (Medium Response):  *Exemplar: A tech who skipped grounding installed RAM that later failed when the system wouldn't POST, causing lost class time and replacement costs.*  Deep Reflection (Extended):  *Exemplar: Following ESD protocols demonstrates professional care, reduces replacement costs, and builds trust with clients.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.1

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Safety & ESD compliance | 8 | 32% |
| Tool handling & identification | 7 | 28% |
| Worksheet accuracy | 5 | 20% |
| Professional conduct | 5 | 20% |

Total points: 25

# Lab 2 – Internal PC Components & Ports Identification

Identify motherboard sockets, RAM, storage interfaces, and power connectors.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Hands-on identification of internal PC components, ports, and connectors to build hardware literacy.

## Learning Objectives

* Name major motherboard components
* Identify common ports and connectors
* Match components to their interfaces

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Motherboard poster / diagram | 1 | 1 |
| Loose sample components (RAM, drives, cards) | Sets | 5 |
| Labeling stickers | bulk | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Label motherboard sockets, ports, and headers. Match sample components to their connectors. Complete a ports identification quiz. | Quick Check (Short Answer):  *Exemplar: Identify ports by name and purpose (e.g., USB-A for peripherals, HDMI for displays).*  Applied Scenario (Medium Response):  *Exemplar: Misidentifying a power connector and forcing it into the wrong header can short a board and require replacement.*  Deep Reflection (Extended):  *Exemplar: Accurate identification reduces repair time and mistakes, reinforcing professional workmanship.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.2

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Identification accuracy | 10 | 40% |
| Matching components | 6 | 24% |
| Quiz score | 5 | 20% |
| Participation | 4 | 16% |

Total points: 25

# Lab 3 – Assembling a Desktop Computer

Full PC build from parts; verify POST and BIOS/UEFI detection.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Guide students through assembling a desktop computer from parts, validating system startup, and basic BIOS checks.

## Learning Objectives

* Assemble a desktop system
* Verify POST and BIOS device detection
* Document assembly and cable routing

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Computer cases | 1 per group | 5 |
| Power supply units (PSU) | 1 per group | 5 |
| Motherboards, CPUs, RAM, storage, GPU (as available) | Sets | 5 |
| Thermal paste | tubes | 3 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Assemble a complete desktop from parts. Verify POST and enter BIOS/UEFI to check device detection. Document cable routing and basic cable management. | Quick Check (Short Answer):  *Exemplar: Confirm POST and BIOS/UEFI device detection after assembling components.*  Applied Scenario (Medium Response):  *Exemplar: Skipping POST checks can hide an unseated CPU cooler, leading to overheating during testing.*  Deep Reflection (Extended):  *Exemplar: Systematic assembly and verification improves reliability and student troubleshooting skills.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.3

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Assembly completeness | 10 | 40% |
| POST/BIOS verification | 7 | 28% |
| Cable management | 4 | 16% |
| Documentation | 4 | 16% |

Total points: 25

# Lab 4 – BIOS/UEFI Configuration & Firmware Updates

Navigate UEFI, set boot order, enable virtualization, update firmware.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Teach BIOS/UEFI navigation, configuration changes for common settings, and safe firmware update procedures.

## Learning Objectives

* Navigate BIOS/UEFI settings
* Create a firmware backup and recovery plan
* Safely apply firmware updates

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| USB flash drives with firmware utilities | 1 per group | 5 |
| Manufacturer BIOS/UEFI update notes | 1 | 1 |
| Firmware release changelog (print) | 1 | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Backup current BIOS/UEFI settings. Perform a firmware update in a controlled environment. Document the process and any changes made to settings. | Quick Check (Short Answer):  *Exemplar: Record current firmware settings and create a recovery USB before updating.*  Applied Scenario (Medium Response):  *Exemplar: An interrupted firmware update can brick a board; a prepared recovery plan prevented data loss in a past incident.*  Deep Reflection (Extended):  *Exemplar: Controlled firmware updates maintain system stability and teach risk mitigation.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.4

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Backup & rollback plan | 6 | 24% |
| Firmware update procedure | 10 | 40% |
| Change documentation | 5 | 20% |
| Safety precautions | 4 | 16% |

Total points: 25

# Lab 5 – Storage Device Installation & Configuration

Install SATA and NVMe drives; partition, format, and verify functionality.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Install and configure both SATA and NVMe storage devices and verify their operation in an OS environment.

## Learning Objectives

* Install SATA and NVMe drives
* Partition and format drives
* Verify read/write operation

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| SATA HDD/SSD | per group | 5 |
| NVMe SSDs / M.2 adapters | sets | 5 |
| SATA cables | various | 10 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Install SATA and NVMe devices properly. Partition and format drives (Windows & Linux examples). Run a basic read/write verification. | Quick Check (Short Answer):  *Exemplar: Verify drive recognition in BIOS/OS after installation and before partitioning.*  Applied Scenario (Medium Response):  *Exemplar: Installing the wrong drive into a RAID array without verifying can result in degraded array performance or data loss.*  Deep Reflection (Extended):  *Exemplar: Careful disk handling and verification protects student work and demonstrates best practices.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.5

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Correct installation | 8 | 32% |
| Partition/format accuracy | 7 | 28% |
| Verification testing | 6 | 24% |
| Cleanup & labeling | 4 | 16% |

Total points: 25

# Lab 6 – Memory & CPU Installation and Testing

Seat and test RAM modules, install CPU and cooling solution.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Practice safe installation and testing of memory modules and CPUs, including cooling and stability checks.

## Learning Objectives

* Install RAM and CPU correctly
* Apply thermal paste and mount cooling
* Run basic stability tests

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Spare RAM modules (various sizes) | sets | 5 |
| CPU sockets sample / spare CPU (if available) | sets | 5 |
| Thermal paste and cooler hardware | sets | 5 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Install and seat RAM modules correctly. Install CPU and cooler, apply thermal paste. Run a simple memory/CPU stability check (memtest/CPU burn). | Quick Check (Short Answer):  *Exemplar: Seat RAM until the latches click and apply even pressure when installing a CPU cooler.*  Applied Scenario (Medium Response):  *Exemplar: Improper cooler mounting caused thermal throttling in a demo system until the mount was corrected.*  Deep Reflection (Extended):  *Exemplar: Proper hardware installation reduces failures and fosters confidence in maintenance tasks.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.6

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| RAM/CPU seating technique | 8 | 32% |
| Thermal application & mounting | 7 | 28% |
| Stability testing | 6 | 24% |
| Documentation | 4 | 16% |

Total points: 25

# Lab 7 – Power Supply Testing & Cable Management

Test voltages with a multimeter; verify PSU wattage and proper routing.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Demonstrate PSU testing, safe cable management, and methods to verify power delivery to components.

## Learning Objectives

* Measure PSU outputs with a multimeter
* Verify proper cable routing and labeling
* Assess PSU capacity vs. system needs

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Multimeter | 1 per group | 5 |
| PSU tester (or spare PSU) | 1 per group | 5 |
| Cable ties and routing supplies | bulk | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Measure PSU voltages and verify rails within tolerance. Inspect and document cable routing and airflow considerations. Practice secure cable fastening and labeling. | Quick Check (Short Answer):  *Exemplar: Use a multimeter to check PSU voltages on all rails before connecting critical components.*  Applied Scenario (Medium Response):  *Exemplar: Identifying a failing 12V rail early prevented damage to GPUs in an earlier lab setup.*  Deep Reflection (Extended):  *Exemplar: Accurate testing improves diagnostic skills and prevents downstream hardware faults.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.7

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Voltage measurements accuracy | 10 | 40% |
| PSU troubleshooting | 6 | 24% |
| Cable routing & safety | 5 | 20% |
| Reporting | 4 | 16% |

Total points: 25

# Lab 8 – Peripheral & Printer Setup

Install and configure wired/wireless printers, input, and output devices.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Install and configure peripherals and printers on both local and networked systems, including driver management.

## Learning Objectives

* Install peripherals and drivers
* Configure networked printers
* Troubleshoot common peripheral issues

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Networked printer or USB printer | 1 per group | 5 |
| Printer drivers (USB/Network) | USB/links | 1 |
| Standard peripherals (keyboard/mouse) | sets | 5 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Install and configure a printer (local and network). Demonstrate driver installation and basic troubleshooting. Document successful print jobs and common errors. | Quick Check (Short Answer):  *Exemplar: Install printer drivers and verify a test page prints from a networked PC.*  Applied Scenario (Medium Response):  *Exemplar: A network misconfiguration prevented printing until the DNS and driver settings were corrected.*  Deep Reflection (Extended):  *Exemplar: Peripheral setup is a common support task that builds real-world troubleshooting experience.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.8

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Printer installation | 8 | 32% |
| Driver/configuration | 6 | 24% |
| Troubleshooting steps | 6 | 24% |
| User documentation | 5 | 20% |

Total points: 25

# Lab 9 – Networking & Cable Creation

Crimp RJ-45 cables, build a small LAN, configure IP settings, and test.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Create and test Ethernet patch cables, set up a small LAN, and practice basic network configuration and troubleshooting.

## Learning Objectives

* Terminate and crimp RJ-45 connectors
* Test cable continuity and wiring
* Configure basic IP settings and test connectivity

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| RJ-45 crimper | 1 per group | 5 |
| Cat5e/Cat6 bulk cable | rolls | 2 |
| Cable tester | 1 per group | 5 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Cut, strip, and crimp RJ-45 connectors to make patch cables. Test cables for continuity and correct wiring. Configure IP addresses and verify network connectivity. | Quick Check (Short Answer):  *Exemplar: Confirm cable wiring matches T568B and test continuity with a cable tester.*  Applied Scenario (Medium Response):  *Exemplar: A miswired cable caused intermittent connectivity; replacing and testing fixed the issue quickly.*  Deep Reflection (Extended):  *Exemplar: Proper cable construction ensures reliable network performance and professional installations.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.9

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Cable construction quality | 10 | 40% |
| Wiring correctness | 6 | 24% |
| Connectivity test | 5 | 20% |
| Network config | 4 | 16% |

Total points: 25

# Lab 10 – Mobile Device Disassembly & Maintenance

Open a laptop or tablet safely; identify internal components and perform cleaning or RAM/SSD replacement.

⏱ Estimated Time: 90 minutes

Core 1 – Hardware & Networking

## Description

Safely disassemble and reassemble mobile devices (laptops/tablets), perform maintenance tasks, and replace common internal components.

## Learning Objectives

* Safely disassemble a laptop
* Replace or upgrade RAM/SSD
* Reassemble and verify proper boot

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Laptop toolkit | 1 per group | 5 |
| Replacement SSD/RAM (common laptop sizes) | sets | 5 |
| Compressed air and cleaning brushes | sets | 5 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Safely disassemble a laptop to access internals. Perform cleaning and replace RAM or SSD where applicable. Reassemble and verify proper boot and device recognition. | Quick Check (Short Answer):  *Exemplar: Follow manufacturer guides when disassembling a laptop and keep track of screws and connectors.*  Applied Scenario (Medium Response):  *Exemplar: Cleaning contacts and replacing a failing SSD resolved slow boot times in a student device.*  Deep Reflection (Extended):  *Exemplar: Safe disassembly practices minimize accidental damage and extend device life.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1201 | 5.10

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Disassembly/Reassembly care | 8 | 32% |
| Component replacement | 7 | 28% |
| Boot verification | 6 | 24% |
| Cleanliness & documentation | 4 | 16% |

Total points: 25

# Lab 11 – Operating System Installation (Windows and Linux)

Install, update, and verify dual-boot or virtual OS environments.

⏱ Estimated Time: 90 minutes

Core 2 – Operating Systems & Security

## Description

Install operating systems (Windows and Linux), manage partitions, drivers, and bootloader configuration for single or dual-boot setups.

## Learning Objectives

* Install Windows/Linux from USB
* Install drivers and update the OS
* Document partitioning and bootloader choices

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Windows and Linux install media (USB) | 1 per group | 5 |
| Drivers / driver packs | links/USB | 1 |
| Virtualization software (optional) | 1 per lab | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Install an OS (Windows) from USB and complete initial setup. Install a Linux distribution (or VM) and verify hardware support. Document partitioning choices and bootloader configuration. | Quick Check (Short Answer):  *Exemplar: Choose appropriate partitions and document the bootloader choices for dual-boot setups.*  Applied Scenario (Medium Response):  *Exemplar: A missing driver prevented network access until the correct NIC driver was installed.*  Deep Reflection (Extended):  *Exemplar: Proper OS installation and documentation prepare students for deployment tasks.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1202 | 5.1

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| OS install correctness | 10 | 40% |
| Driver/install troubleshooting | 6 | 24% |
| Partition/bootloader setup | 5 | 20% |
| Documentation | 4 | 16% |

Total points: 25

# Lab 12 – System Configuration & User Account Management

Manage accounts, permissions, startup services, and recovery tools.

⏱ Estimated Time: 90 minutes

Core 2 – Operating Systems & Security

## Description

Configure system accounts, permissions, and recovery options to practice secure system administration tasks.

## Learning Objectives

* Create and manage user accounts
* Configure permissions and UAC
* Set up recovery media and options

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Admin account checklist | print | 1 |
| Sample user accounts to create | list | 1 |
| Recovery media (USB) | 1 per group | 5 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Create and manage local user accounts and groups. Configure permissions and UAC settings. Set up recovery options and document rollback steps. | Quick Check (Short Answer):  *Exemplar: Create least-privilege accounts and verify UAC and recovery options are configured.*  Applied Scenario (Medium Response):  *Exemplar: An admin account left unprotected allowed unauthorized changes in a test VM; enforcing policies prevented recurrence.*  Deep Reflection (Extended):  *Exemplar: Good account management practices support security and maintain operational integrity.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1202 | 5.2

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Account & permissions setup | 8 | 32% |
| Recovery options configured | 6 | 24% |
| Policy application | 6 | 24% |
| Documentation | 5 | 20% |

Total points: 25

# Lab 13 – System Maintenance & Performance Monitoring

Use Task Manager, Event Viewer, and maintenance utilities to monitor and tune systems.

⏱ Estimated Time: 90 minutes

Core 2 – Operating Systems & Security

## Description

Use system monitoring tools to capture performance baselines, analyze logs, and recommend performance improvements.

## Learning Objectives

* Capture performance metrics
* Analyze Event Viewer logs
* Recommend and apply tuning steps

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Performance monitoring guide | print | 1 |
| System utilities (Task Manager, PerfMon) | installed | 1 |
| Sample baseline test scripts | print/USB | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Capture baseline performance metrics. Use Event Viewer to find and interpret system logs. Make recommendations to improve performance based on findings. | Quick Check (Short Answer):  *Exemplar: Collect baseline CPU, memory, and disk metrics before making tuning changes.*  Applied Scenario (Medium Response):  *Exemplar: Event Viewer revealed a recurring driver error that, once fixed, improved system stability.*  Deep Reflection (Extended):  *Exemplar: Regular maintenance and monitoring reduce downtime and teach preventative care.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1202 | 5.3

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Baseline capture accuracy | 8 | 32% |
| Log analysis | 7 | 28% |
| Tuning recommendations | 6 | 24% |
| Report quality | 4 | 16% |

Total points: 25

# Lab 14 – Security Hardening & Malware Removal

Configure antivirus, firewall, encryption, and practice safe malware removal steps.

⏱ Estimated Time: 90 minutes

Core 2 – Operating Systems & Security

## Description

Practice malware detection and removal in an isolated environment while implementing baseline security hardening measures.

## Learning Objectives

* Scan and contain malware in an isolated VM
* Apply baseline security settings
* Document remediation steps

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Antivirus tools (trial or lab versions) | links | 1 |
| Isolated malware removal VM (safe samples) | 1 lab VM | 1 |
| Backup and restore media | USB | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Scan and remove simulated malware in an isolated environment. Configure firewall/antivirus baseline policies. Document the remediation steps taken. | Quick Check (Short Answer):  *Exemplar: Run scans in an isolated environment and document remediation steps thoroughly.*  Applied Scenario (Medium Response):  *Exemplar: An isolated malware sample was analyzed and removed without affecting production systems.*  Deep Reflection (Extended):  *Exemplar: Security workflows and containment protect data and teach responsible remediation.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1202 | 5.4

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Malware detection/removal | 10 | 40% |
| Policy/hardening steps | 7 | 28% |
| Isolation & safety | 4 | 16% |
| Remediation report | 4 | 16% |

Total points: 25

# Lab 15 – Capstone – PC Build & Troubleshooting Challenge

Simulate hardware and OS faults; students diagnose, repair, and document their process.

⏱ Estimated Time: 90 minutes

Core 2 – Operating Systems & Security

## Description

Capstone project: combine hardware assembly, troubleshooting, OS setup, and documentation into a real-world repair/diagnostic challenge.

## Learning Objectives

* Diagnose hardware/software faults
* Apply repairs and verify operation
* Produce a final report documenting root cause and fixes

## Materials Needed

|  |  |  |
| --- | --- | --- |
| Item | Qty per Group | Total (Est.) |
| Full component kits for builds | sets | 5 |
| Troubleshooting scenario cards | deck | 1 |
| Assessment rubric | print | 1 |

## Procedure and Reflection

|  |  |
| --- | --- |
| Tasks / Procedure | Reflections |
| Work through assigned fault scenarios and diagnose the cause. Repair or reconfigure hardware/software to return system to working order. Prepare a short report documenting steps, root cause, and lessons learned. | Quick Check (Short Answer):  *Exemplar: Use a structured troubleshooting approach to isolate hardware vs software faults.*  Applied Scenario (Medium Response):  *Exemplar: Recreating a fault scenario and applying stepwise fixes demonstrated clear root-cause resolution.*  Deep Reflection (Extended):  *Exemplar: Documenting the process strengthens problem-solving skills and provides evidence of learning.* |

## Teacher Notes & Grading Checklist

✔ Ensure each student has safety gear and workstation ready.

✔ Observe procedure compliance and tool handling.

✔ Award points for accuracy, documentation, and teamwork.

Aligned Objective: CompTIA A+ 220-1202 | 5.5

## Assessment Rubric

|  |  |  |
| --- | --- | --- |
| Criterion | Points | Percent |
| Diagnosis accuracy | 10 | 40% |
| Repair effectiveness | 8 | 32% |
| Time management/problem solving | 4 | 16% |
| Final report & lessons learned | 3 | 12% |

Total points: 25

# Rubric Summary (Condensed)

|  |  |  |
| --- | --- | --- |
| **Lab 1 — Tool Familiarization & ESD Safety** — Total: 25 pts  • Safety & ESD compliance — 8 pts (32%)  • Tool handling & identification — 7 pts (28%)  • Worksheet accuracy — 5 pts (20%)  • Professional conduct — 5 pts (20%)  **Lab 2 — Internal PC Components & Ports Identification** — Total: 25 pts  • Identification accuracy — 10 pts (40%)  • Matching components — 6 pts (24%)  • Quiz score — 5 pts (20%)  • Participation — 4 pts (16%)  **Lab 3 — Assembling a Desktop Computer** — Total: 25 pts  • Assembly completeness — 10 pts (40%)  • POST/BIOS verification — 7 pts (28%)  • Cable management — 4 pts (16%)  • Documentation — 4 pts (16%)  **Lab 4 — BIOS/UEFI Configuration & Firmware Updates** — Total: 25 pts  • Backup & rollback plan — 6 pts (24%)  • Firmware update procedure — 10 pts (40%)  • Change documentation — 5 pts (20%)  • Safety precautions — 4 pts (16%)  **Lab 5 — Storage Device Installation & Configuration** — Total: 25 pts  • Correct installation — 8 pts (32%)  • Partition/format accuracy — 7 pts (28%)  • Verification testing — 6 pts (24%)  • Cleanup & labeling — 4 pts (16%) | **Lab 6 — Memory & CPU Installation and Testing** — Total: 25 pts  • RAM/CPU seating technique — 8 pts (32%)  • Thermal application & mounting — 7 pts (28%)  • Stability testing — 6 pts (24%)  • Documentation — 4 pts (16%)  **Lab 7 — Power Supply Testing & Cable Management** — Total: 25 pts  • Voltage measurements accuracy — 10 pts (40%)  • PSU troubleshooting — 6 pts (24%)  • Cable routing & safety — 5 pts (20%)  • Reporting — 4 pts (16%)  **Lab 8 — Peripheral & Printer Setup** — Total: 25 pts  • Printer installation — 8 pts (32%)  • Driver/configuration — 6 pts (24%)  • Troubleshooting steps — 6 pts (24%)  • User documentation — 5 pts (20%)  **Lab 9 — Networking & Cable Creation** — Total: 25 pts  • Cable construction quality — 10 pts (40%)  • Wiring correctness — 6 pts (24%)  • Connectivity test — 5 pts (20%)  • Network config — 4 pts (16%)  **Lab 10 — Mobile Device Disassembly & Maintenance** — Total: 25 pts  • Disassembly/Reassembly care — 8 pts (32%)  • Component replacement — 7 pts (28%)  • Boot verification — 6 pts (24%)  • Cleanliness & documentation — 4 pts (16%) | **Lab 11 — Operating System Installation (Windows and Linux)** — Total: 25 pts  • OS install correctness — 10 pts (40%)  • Driver/install troubleshooting — 6 pts (24%)  • Partition/bootloader setup — 5 pts (20%)  • Documentation — 4 pts (16%)  **Lab 12 — System Configuration & User Account Management** — Total: 25 pts  • Account & permissions setup — 8 pts (32%)  • Recovery options configured — 6 pts (24%)  • Policy application — 6 pts (24%)  • Documentation — 5 pts (20%)  **Lab 13 — System Maintenance & Performance Monitoring** — Total: 25 pts  • Baseline capture accuracy — 8 pts (32%)  • Log analysis — 7 pts (28%)  • Tuning recommendations — 6 pts (24%)  • Report quality — 4 pts (16%)  **Lab 14 — Security Hardening & Malware Removal** — Total: 25 pts  • Malware detection/removal — 10 pts (40%)  • Policy/hardening steps — 7 pts (28%)  • Isolation & safety — 4 pts (16%)  • Remediation report — 4 pts (16%)  **Lab 15 — Capstone – PC Build & Troubleshooting Challenge** — Total: 25 pts  • Diagnosis accuracy — 10 pts (40%)  • Repair effectiveness — 8 pts (32%)  • Time management/problem solving — 4 pts (16%)  • Final report & lessons learned — 3 pts (12%) |