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SUMMARY

Title: Chapter 3: Advanced Computer Hardware (IT Essentials v7.0).

Focus: Understanding firmware, electrical power, advanced computer functions, hardware upgrades, and environmental safety.

Slides 14–15 – Sections & Objectives

3.1 Boot the Computer: Configure BIOS/UEFI, describe POST, BIOS, CMOS, UEFI.

3.2 Electrical Power: Explain wattage, voltage, power fluctuations, and protective devices.

3.3 Advanced Computer Functionality: CPU architecture, RAID, ports/cables, monitor features.

3.4 Computer Upgrade: Select appropriate components for upgrades, including specialized systems.

3.5 Protecting the Environment: Safe disposal methods for computer parts.

Slides 16–23 – Boot Process (POST, BIOS, CMOS, UEFI)

POST (Power-On Self-Test): Hardware diagnostic check during boot; errors/beep codes identify problems.

BIOS (Basic Input/Output System): A ROM chip that manages OS–hardware communication; identifies drives, memory, and port configurations.

CMOS: Stores BIOS settings using a battery. A failing battery may cause loss of date/time settings.

UEFI (Unified Extensible Firmware Interface): Modern replacement for BIOS; supports larger drives, 32/64-bit systems, and Secure Boot to prevent rootkits.

Labs/Demos: Hands-on tasks—exploring firmware settings, adjusting boot order, configuring BIOS/UEFI.

Slides 24–25 – BIOS/UEFI Configuration & Security

Security Features:

Password protection for BIOS.

Drive encryption.

LoJack (remote location/lock/wipe).

Trusted Platform Module (TPM) for secure storage of keys and certificates.

Secure Boot (verifies trusted OS).

Firmware Updates:

Modern BIOS stored in EEPROM allows user updates (“flashing”).

Updates improve stability, performance, and hardware compatibility.

Slides 26–28 – Practical Labs

Lab tasks include:

Searching for BIOS/UEFI updates.

Installing Windows 10.

Installing/removing third-party software (e.g., Packet Tracer).

Slides 29–30 – Electrical Power (Basics)

Key Electrical Units:

Voltage (V): Work needed to move charger

Current (I): Flow of electrons.

Resistance (R): Opposition to current flow.

Power (P): Work done per second, measured in Watts.

Formulas:

Ohm’s Law: $V = I \times R$

Power: $P = V \times I$