Miami Dade College

Course Description

CET1178C | A+ Computer Hardware Service | 3.00 credits

This is an intermediate level course that prepares students for A+ hardware certification. Students will learn how to: install, configure, and upgrade components diagnose and troubleshoot computer systems, identify, test, and troubleshoot motherboards, processors, memory, and printers, and connect network equipment. Prerequisite: CET1171. A.S. credit only.

Course Competencies:

Competency 1: The student will demonstrate an understanding of basic computer technician fundamentals by:

1. Describing how digital computers operate
2. Describing the development of microcomputer system architecture
3. Assembling and disassembling computers
4. Showing how to handle components safely

Competency 2: The student will demonstrate an understanding of motherboards, processors, and memory by:

1. Distinguishing current CPU chips and describing their characteristics
2. Installing CPUs, and configuring the voltage, clock multiplier, and bus speed
3. Identifying the types of RAM (Random Access Memory), form factors, and operational characteristics, and determining the banking and speed requirements
4. Identifying current models of motherboards, their components, processor sockets, memory banks, expansion capabilities, connectors, features and architectures
5. Configuring CMOS (Complementary Metal-Oxide Semiconductor) memory and Non-Volatile Random- Access Memory (NVRAM), to change setup parameters and features on the motherboard

Competency 3: The student will demonstrate an understanding of how to install, configure, and upgrade standard desktop computer components by:

1. Identifying the names, purposes, and characteristics of desktop system components
2. Adding and removing field-replaceable modules for desktop systems in accordance with established procedures
3. Identifying typical IRQs, DMAs, and I/O addresses, and altering these settings when installing and configuring devices
4. Following established practices to install and configure common IDE devices
5. Installing, configuring, and upgrading system components

Competency 4: The demonstrate an understanding of how to install advanced devices, external components, and performance enhancements by:

1. Identifying the fundamental principles of SCSI devices, and installing, configuring, optimizing, and upgrading SCSI devices
2. Identifying the fundamental principles of RAID devices, and installing, configuring, optimizing, and upgrading RAID devices
3. Identifying the fundamental principles of external and networked storage devices, and installing, configuring, optimizing, and upgrading storage devices
4. Installing, configuring, optimizing, and upgrading advanced internal adapters
5. Installing, configuring, optimizing, and upgrading advanced power and cooling systems enhancements
6. Installing, configuring, and optimizing common peripheral devices such as modems, cameras, PDAs, audio and video devices, and other external devices using accepted practices and procedures

Competency 5: The student will demonstrate an understanding of how to diagnose and troubleshoot computer system problems by:

1. Describing basic troubleshooting procedures and tools

2. Practicing techniques for eliciting information and problem symptoms from customers and analyzing the customer environment
3. Identifying common problems associated with individual system components and their symptoms
4. Using tools, diagnostic procedures and techniques for isolating and troubleshooting problems, and performing corrective measures and component replacement
5. Performing service tests, benchmarks and validation procedures
6. Describing and performing preventive maintenance, safety and environmental control procedures

Competency 6: The student will demonstrate an understanding of how to install, configure, and upgrade laptops and portable devices by:

1. Identifying the fundamental principles of laptops and portable devices
2. Identifying the names, purposes, and performance characteristics of peripheral ports, associated cabling, connectors, external devices, docking stations, and port replicators
3. Installing, configuring, optimizing and upgrading laptops and portable devices
4. Identifying and using tools, basic diagnostic procedures, and troubleshooting methods for laptops and portable devices
5. Performing preventive maintenance on laptops and portable devices

Competency 7: The student will demonstrate an understanding of how to install, maintain, and repair printers and scanners by:

1. Identifying the fundamental principles of printers and scanners
2. Describing printer and scanning technologies, explaining how the devices work, and identifying the various types of printers and scanners
3. Identifying and describing the handling of printer and scanner components, interfaces, connectors, consumables, and accessories
4. Installing, configuring, optimizing, and upgrading printers and scanners
5. Identifying and using the tools, diagnostic procedures, and troubleshooting techniques for printers and scanners

Competency 8: The student will demonstrate an understanding of networking by:

1. Identifying common types of network cables, their characteristics, and connectors
2. Explaining basic networking concepts including how a network works
3. Installing and configuring network cards
4. Connecting computers to a network
5. Establishing Internet connectivity by installing and configuring communication devices

Competency 9: The student will demonstrate an understanding of security by:

1. Identifying the fundamental principles of security
2. Installing, configuring, upgrading, optimizing, and maintaining security and security devices
3. Identifying tools, diagnostic procedures, and troubleshooting techniques for security

Competency 10: The student will demonstrate an understanding of safety and professionalism by:

1. Describing the aspects and importance of safety and environmental issues
2. Identifying potential hazards and implementing proper safety procedures including ESD precautions and procedures, safe work environment and equipment handling
3. Identifying proper disposal procedures for batteries, display devices, electronic devices, chemical solvents and other materials
4. Demonstrating communication skills, including listening and discretion, when communicating with customers and colleagues
5. Demonstrating job-related professional behavior including notation of privacy, confidentiality and respect for the customer and customers' property

Learning Outcomes:

- Solve problems using critical and creative thinking and scientific reasoning
- Use computer and emerging technologies effectively
- Describe how natural systems function and recognize the impact of humans on the environment