AOIT Computer Systems
Course Scope and Sequence

July 2021

The Computer Systems course provides a hands-on introduction to computer systems, including aspects of servicing, upgrading, and maintaining hardware and software. It is one of the core courses offered by the Academy of Information Technology. Computer Systems walks students through setting up hardware, installing software, connecting to a network, and connecting to the Internet. It guides students through servicing, upgrading, and maintaining processing components, memory and storage components, input components, and output components. It also addresses protecting, maintaining, and upgrading software and provides troubleshooting techniques. Finally, students get a chance to discover what types of careers exist in systems work today.

For the culminating project, students apply the knowledge they gain throughout the course to completely disassemble a computer system, troubleshoot for hardware failures as needed, and then reassemble the system. They also load the operating system and other software applications onto the rebuilt system and connect it to a network. To document their work, students create a poster that presents their completed work.

This course is expected to take a total of 78 50-minute class periods.

Unit 1: Getting Started

Lesson 1: Course Introduction

Estimated # of Class Periods: 2

Learning Objectives

- Infer the skills and knowledge about computer systems needed to be successful in an authentic project
- Identify general computer systems terms with which to build a taxonomy

Lesson 2: Peripherals and Drivers

Estimated # of Class Periods: 6

Learning Objectives

- Describe how analog signals are translated to digital, and vice versa
- Demonstrate the ability to convert numbers from decimal to hex and binary
- Explain how keyboards and mice transfer data to the computer
- Describe the differences between the types of tracking devices
- Compare and contrast different output devices such as printers and monitors
- Demonstrate the ability to install a new peripheral and related drivers

Lesson 3: Managing Software

Estimated # of Class Periods: 3

Learning Objectives

- Demonstrate the ability to locate and operate system tools that ensure software runs smoothly on a computer
- Characterize the system configuration required for a piece of software
- Evaluate whether a piece of software will run successfully on a specific computer

Unit 2: Security

Lesson 4: Malware

Estimated # of Class Periods: 4

Learning Objectives

- Describe different types of software vulnerabilities
- Interpret malware-related symptoms and draw conclusions
- Characterize malware symptoms and design a troubleshooting approach
- Describe behaviors to cut down on vulnerability to exploits

Lesson 5: Basic Data Protection

Estimated # of Class Periods: 4

Learning Objectives

- Demonstrate the ability to apply appropriate procedures for protecting a PC and its data
- Describe the types of monitoring used to protect a system's files
- Evaluate different backup/recovery plans
- Compare and contrast the different methods of recovering erased files

Unit 3: Operating Systems

Lesson 6: Windows Operating Systems Overview

Estimated # of Class Periods: 5

Learning Objectives

- Describe the primary functions of an operating system
- Distinguish the characteristics of different versions of Windows
- Classify the kinds of OS tools that are used to examine and maintain a system

Lesson 7: Installing and Upgrading the OS

Estimated # of Class Periods: 4

Learning Objectives

- Describe when and how to upgrade an operating system
- Explain why it is important to keep an operating system up-to-date
- Create a plan to install an operating system and provide maintenance

Lesson 8: Overview of Linux and Mac OS X Operating Systems

Estimated # of Class Periods: 3

Learning Objectives

- Describe distinguishing characteristics of the Linux and Mac OS X operating systems
- Compare and contrast the Linux and Mac OS X operating systems with Windows and describe the advantages and disadvantages of each
- Display an understanding of the basic operating system functions of Linux

Unit 4: Hardware and Electricity

Lesson 9: Computer Hardware Safety

Estimated # of Class Periods: 3

Learning Objectives

- Demonstrate the ability to apply proper safety measures when working with computers
- Identify environmental concerns related to computers
- Explain how to protect computer hardware from fluctuations in the power supply, power outages, and other electrical issues

Lesson 10: FRUs, Form Factors, and Ports

Estimated # of Class Periods: 4

Learning Objectives

- Identify and compare common FRUs and form factors
- Describe the uses of common FRUs and form factors
- Display understanding of troubleshooting strategies for problems caused by FRUs
- Differentiate between different ports and connectors
- Summarize the technical characteristics of different ports and connectors

Lesson 11: Motherboards and Their Components

Estimated # of Class Periods: 9

Learning Objectives

- Compare and contrast the main types of motherboards, processors, and physical memory
- Explain how motherboards, processors, and physical memory work
- Describe the function of the front- and back-side buses on the motherboard
- Identify protective measures for motherboards and their components
- Explain installation and upgrade procedures for motherboards, processors, and RAM
- Identify troubleshooting methods related to problems with motherboards, boot processes, processors, and RAM

Unit 5: Memory and Storage Devices

Lesson 12: How Memory Works

Estimated # of Class Periods: 3

Learning Objectives

- Explain the difference between memory and storage
- Describe how computer memory works
- Compare and contrast the different kinds of computer memory
- Identify and evaluate what type of RAM typical computers need

Lesson 13: Storage Technologies and Devices

Estimated # of Class Periods: 4

Learning Objectives

- Describe how different types of computer storage technologies and devices work
- Explain how data is transferred to and from storage devices
- Differentiate between types of storage devices in terms of their applicability to specific uses

Unit 6: Networks

Lesson 14: Network Components

Estimated # of Class Periods: 3

Learning Objectives

- Identify the hardware components that make up LANs, WANs, and the Internet
- Describe the functions of network operating system software and how it interfaces with client computer operating systems
- Display understanding of the main protocols used to send information across a network

- Compare and contrast wired and wireless connections

Lesson 15: Connecting to a Network

Estimated # of Class Periods: 3

Learning Objectives

- Compare and contrast different methods of connecting a PC to a LAN
- Explain how to use a NIC and any associated connection utilities
- Demonstrate understanding of how to obtain Internet access with a PC

Lesson 16: Maintaining and Optimizing a Network

Estimated # of Class Periods: 3

Learning Objectives

- Identify system settings that can be optimized for security and network performance
- Describe benefits and limitations of add-on security software firewalls and antivirus programs
- Demonstrate the ability to test network speed and troubleshoot network slowdowns
- Explain the importance of network optimization and maintenance, as well as how to handle network problems from within a client computer system

Unit 7: Careers and Course Closure

Lesson 17: Putting It All Together

Estimated # of Class Periods: 7

Learning Objectives

- Evaluate a computer system's hardware to troubleshoot any hardware failures that might be present
- Demonstrate the ability to disassemble a working computer without breaking any parts
- Demonstrate the ability to assemble a complete working computer system
- Demonstrate the ability to manage a computer's software library, including the installation of the operating system and other necessary applications

Lesson 18: Working in Computer Systems and Learning from Industry Experts

Estimated # of Class Periods: 4

Learning Objectives

- List the types of jobs that are available for computer systems professionals
- Describe entry-level jobs in the computer systems industry and corresponding qualifications
- Evaluate which jobs are most suitable based on personal interests and skills

Lesson 19: Project Presentation and Course Closure

Estimated # of Class Periods: 4

Learning Objectives

- Evaluate personal experience and performance in the course
- Summarize key learning across the whole subject of computer systems