

# IT Essentials

## Scope and Sequence

Version 8.0

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## Target Audience

The Cisco® IT Essentials course is designed for Cisco Networking Academy® students in upper secondary schools, technical schools, and colleges or universities who want to pursue careers in IT and learn how computers work, how to assemble computers, and how to troubleshoot hardware and software issues.

## Prerequisites

There are no prerequisites for this course.

## Certification Alignment

The IT Essentials 8 aligns with the [CompTIA A+ Certification](#).

## Course Description

This course covers the fundamentals of computer and mobile device hardware and software, and advanced concepts such as security, networking, and the responsibilities of an IT professional. Students who complete this course will be able to describe the internal components of a computer, assemble a computer system, install operating systems, and troubleshoot them using software tools and diagnostics. Students will also be able to connect to the Internet and share resources in a networked environment. New topics in this version include DNS records, spam management, virtual LAN (VLAN), and privacy and gaming. Operating System Upgrades, Windows Configuration, and IT Professional knowledge areas have been greatly expanded.

Cisco Packet Tracer activities are designed for use the latest version of Packet Tracer.

## Course Objectives

The course introduces students to computer hardware and software, as well as operating systems, networking concepts, mobile devices, IT security, and troubleshooting. **The online course materials assist the student in developing the skills necessary to work as a technician in the field of IT.** The specific skills covered in each chapter are described at the start of each chapter.

Upon completion of the IT Essentials 8.0 course, students can perform the following tasks:

- Select the appropriate computer components to build, repair, or upgrade personal computers.
- Install and configure components to build, repair, or upgrade personal computers.
- Perform troubleshooting on personal computers.
- Explain how computers communicate on a network.
- Configure devices to communicate on a network.
- Explain how to troubleshoot laptops and other mobile devices.

- Install a printer to meet requirements.
- Describe virtualization and cloud computing.
- Install Windows operating systems.
- Perform management and maintenance of Windows operating systems.
- Explain how to configure, secure, and troubleshoot mobile, MacOS, and Linux operating systems.
- Implement basic host, data, and network security.
- Explain the roles and responsibilities of the IT Professional.

## Equipment Requirements

For the best learning experience, we recommend a typical class size between 12 to 15 students and a ratio of one Lab PC per student. At most, two students can share one Lab PC for the hands-on labs. Some lab activities require the student Lab PCs to be connected to a local network.

Student Lab PCs in various states of assembly and repair are not suitable for viewing the course.

### Lab PC Hardware Requirements

To implement the different topologies used in the lab exercises, Academies are required to use the following minimum equipment requirements:

- Windows 10 or Windows 11 (course will focus on Windows 10)
- 1 PC Case with a minimum 300W power supply
- 1 PCI, PCIe, or AGP-compatible motherboard
- Intel or AMD CPU, 1 gigahertz (GHz) or faster with support for PAE, NX, and SSE2 or System on a Chip (SoC)
- 1 CPU heat sink and cooling fan
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit) (1 X 1GB or 2 X 1GB suggested)
  - Some labs will require one module of RAM to be uninstalled or the simulation of a faulty module for troubleshooting purposes.
- 32 GB hard drive (minimum); 80 GB or more (recommended)
- The computer must support a full installation of Windows and two additional partitions of the same size
- 1 DVD-ROM (minimum), DVDR, or BD/BDR
- 1 Ethernet Card (If the motherboard does not have an Ethernet port)
- 1 Wireless network adapter (compatible with the wireless router)
- 1 PCI, PCIe (recommended), or AGP video card

- DirectX 9 or later graphics device with WDDM 1.0 driver
- Cables to connect HDD/CD (Quantities vary)
- 1 Mouse
- 1 Keyboard
- 1 Super VGA (1024 X 768) or higher-resolution video monitor

### **Lab PC Software Requirements**

IT Essentials 8.0 content focuses on Microsoft Windows 10. Microsoft offers discount programs for academic institutions to purchase software at a reduced cost. Please visit the Microsoft website for your country or region to learn more.

### **Lab PC Repair Tools**

The computer toolkit should include the following tools:

- Phillips screwdriver
- Flathead screwdriver
- Hex Socket Drivers (various sizes) (optional)
- Electrostatic discharge (ESD) wrist strap and cord
- Electrostatic discharge (ESD) mat with a ground cord
- Safety glasses
- Lint-free cloth
- Electronics cleaning solution (optional)
- Flashlight
- Thermal compound
- Multimeter
- Compressed air service canister (optional due to globally varying classroom health and safety laws)
- Power supply tester
- Wire cutters
- RJ-45 Crimpers
- Cable strippers
- Modular cable tester

- Standard technician toolkit
- Network Loop back plugs (optional)

### Additional Required Lab Equipment

In addition to the equipment specified above, the lab topologies of IT Essentials require the use of the following equipment and accessories:

- 1 Internet connection for Internet searches and driver downloads (this could be the instructor's workstation)
- 1 printer or integrated printer/scanner/copier for the class to share
- 1 wireless router with WPA2 support for the class to share
- Ethernet cable and RJ-45 connectors for building and testing cables
- Various USB flash drives for moving files between computers in the lab
- Smartphones and tablets are desirable for use with the labs in the Mobile Devices chapter
- Spare parts and hardware both working and broken for parts replacement and/or troubleshooting labs

## Course Outline

This course provides a comprehensive introduction to the IT industry and in-depth exposure to personal computers, hardware, and operating systems. Students learn how various hardware and software components work and best practices in maintenance, safety, and security. Through hands-on lab activities, students learn how to assemble and configure computers, install operating systems and software, and troubleshoot hardware and software issues.

[Table 1](#) details the modules and associated competencies. Each module is an integrated unit of learning that consists of content, activities, and assessments that target a specific set of competencies. The size of the module depends on the depth of knowledge and skill needed to master the competency.

**Table 1: Module Title and Objective**

Module / topic	Goals/Objectives
<b>1. Introduction to Personal Computer Hardware</b>	<b>Select the appropriate computer components to build, repair, or upgrade personal computers.</b>
1.1 Personal Computers	Explain how personal computer components work together.
1.2 PC Components	Explain the Features and Functions of components.

Module / topic	Goals/Objectives
1.3 Computer Disassembly	Disassemble a PC.
<b>2. PC Assembly</b>	<b>Install components to build, repair, or upgrade personal computers.</b>
2.1 Assemble the Computer	Build a computer.
<b>3. Advanced Computer Hardware</b>	<b>Install and configure components to upgrade a computer.</b>
3.1 Boot the Computer	Explain how to verify BIOS and UEFI settings.
3.2 Electrical Power	Explain electrical power.
3.3 Advanced Computer Functionality	Explain computer functionality.
3.4 Computer Configuration	Select components to upgrade a computer to meet requirements
3.5 Protecting the Environment	Explain the necessary procedures to protect the environment
<b>4. Preventive Maintenance and Troubleshooting</b>	<b>Perform Troubleshooting on personal computers.</b>
4.1 Preventive Maintenance	Explain why preventive maintenance must be performed on personal computers.
4.2 Troubleshooting Process	Troubleshoot problems with PC and Peripheral devices
<b>5. Networking Concepts</b>	<b>Explain how computers communicate on a network.</b>
5.1 Network Components and Types	Explain the components and types of computer networks.
5.2 Networking Protocols, Standards, and Services	Explain networking protocols, standards, and services.
5.3 Network Devices	Explain the purpose of devices on a network.
5.4 Network Cables	Build a network cable.
<b>6. Applied Networking</b>	<b>Configure devices to communicate on a network.</b>
6.1 Device to Network Connection	Configure devices for wired and wireless networks.
6.2 Basic Troubleshooting Process for Networks	Troubleshoot problems and solutions related to networks.
Chapter 7. Laptops and Other Mobile Devices	Explain how to troubleshoot Laptops and other Mobile Devices.
7.1 Characteristics of Laptops and Other Mobile Devices.	Explain the features and functions of laptops and other mobile devices.
7.2 Laptop Configuration	Explain how to configure laptop power settings and wireless settings.
7.3 Laptop Hardware and Component Installation and Configuration	Explain how to remove and install laptop components.

Module / topic	Goals/Objectives
7.4 Other Mobile Device Hardware Overview	Explain the purpose and characteristics of other mobile devices.
7.5 Network Connectivity and Email	Explain how to configure network connectivity and email on mobile devices.
7.6 Preventive Maintenance for Laptops and Other Mobile Devices.	Use common preventive maintenance techniques for Laptops and other Mobile Devices.
7.7 Basic Troubleshooting Process for Laptops and other Mobile Devices	Explain how to troubleshoot Laptops and other Mobile Devices.
<b>Chapter 8. Printers</b>	<b>Install a printer to meet requirements.</b>
8.1 Common Printer Features	Explain the purpose and characteristics of different types of printers.
8.2 Printer Type Comparison	Compare Different Types of Printers
8.3 Installing and Configuring Printers	Install a printer.
8.4 Sharing Printers	Configure printer sharing.
8.5 Maintaining and Troubleshooting Printers	Explain how to improve printer availability.
<b>9. Virtualization and Cloud Computing</b>	<b>Describe virtualization and cloud computing</b>
9.1 Virtualization	Explain Cloud and Virtualization.
9.2 Cloud Computing	Compare and contrast cloud computing concepts
<b>10. Windows Installation</b>	<b>Install Windows operating systems</b>
10.1 Modern Operating Systems	Explain operating system requirements.
10.2 Disk Management	Create a partition in Windows using the Disk Management Utility.
10.3 Installation and Boot Sequence	Install a Windows Operating System
<b>11. Windows Configuration</b>	<b>Perform management and maintenance of Windows operating systems</b>
11.1 Windows Desktop and File Explorer	Configure the Windows Desktop and File Explorer.
11.2 Configure Windows using Control Panels	Configuring Windows with Control Panels.
11.3 System Administration	Use Windows tools and utilities to manage Windows system.
11.4 Command- Line Tools	Use Microsoft Windows command line tools.
11.5 Windows Networking	Configure a Windows computer to work on a network.
11.6 Common Preventive Maintenance Techniques for Operating Systems	Use common preventive maintenance on a computer using Microsoft Windows tools.



Module / topic	Goals/Objectives
11.7 Basic Troubleshooting Process for Windows Operating System	Explain how to troubleshoot Microsoft Windows operating system.
<b>12. Mobile, Linux, and OSX Operating Systems</b>	<b>Explain how to configure, secure, and troubleshoot mobile, Mac, and Linux operating systems</b>
12.1 Mobile Operating Systems	Explain the purpose and characteristics of mobile operating systems.
12.2 Methods for Securing Mobile Devices	Explain methods for securing mobile devices.
12.3 Linux and macOS Operating Systems	Explain the purpose and characteristics of macOS and Linux operating systems.
12.4 Basic Troubleshooting Process for Mobile, Linux, and macOS Operating Systems	Explain how to troubleshoot other operating systems.
<b>13. Security</b>	<b>Implement basic host, data, and network security</b>
13.1 Security Threats	Explain Security Threats
13.2 Security Procedures	Explain Security Procedures
13.3 Securing Windows Workstations	Configure basic security settings and policies for end devices.
13.4 Wireless Security	Configure wireless security
13.5 Basic Troubleshooting Process for Security	Explain the six steps of the troubleshooting process for security.
<b>14. The IT Professional</b>	<b>Explain the roles and responsibilities of the IT Professional</b>
14.1 Communication Skills and the IT Professional	Explain why strong communication skills are critical for IT work.
14.2 Operational Procedures	Explain how to manage change and unplanned disruptions in a business environment.
14.3 Ethical and Legal Considerations	Explain appropriate behavior when faced with the legal and ethical issues that arise in the IT industry.
14.4 Call Center Technicians	Explain the call center environment and technician responsibilities.