IT Essentials 6.0:
PC Hardware and Software (CompTIA A+)
This course offers an in-depth understanding of computer hardware and operating systems with an emphasis on practical experience to help participants develop fundamental computer skills, along with essential career skills. Participants learn the functionality of hardware and software components as well as suggested best practices in maintenance, diagnosis, troubleshooting and safety issues. Through hands on activities and labs, students learn how to assemble and configure a computer, install operating systems and software, and troubleshoot hardware and software problems. In addition, an introduction to networking is included. This e-course helps participants prepare to earn CompTIA's A+ certification.

- A comprehensive overview of computer hardware and software with an introduction to advanced concepts
- Designed for students pursuing careers in IT who want practical knowledge of how different types of computing devices work
- Interactive learning experience with hands-on labs, assessments that provide immediate diagnostic feedback.
- Cisco Packet Tracer activities are designed for use with Packet Tracer 6.2 and support alignment with the new CompTIA A+ certification objectives
- Introduce the student to computer and mobile devices hardware and software, as well as operating systems, networking concepts, IT security, and troubleshooting
- Available in netacad.com with improved user interface and navigation features

Content Changes from IT Essentials 5.0

- Aligns with updated CompTIA A+ 200-901 and 200-902 certification exams
- Focus on the skills needed to perform the job, not on the specific features and functions of different operating systems
- Updated and expanded content in: cybersecurity, mobile devices, troubleshooting and a variety of operating systems
- New topics added to align with certification changes:
  - Mac OS (OS X) and Windows Phone
  - Data Centers and Cloud Computing
  - Networked Host Services
  - Basic Linux CLI commands
  - Motion Sensors, Touchpads, Smartcard readers
  - Windows 8 & 8.1

The exams are administered through Pearson VUE (Virtual University Enterprises) and are not part of the course. See http://pearsonvue.com/comptia
Benefits to a Student:
- Offers a comprehensive introduction to the IT industry
- Provides a comprehensive introduction to the IT industry and in-depth exposure to personal computers, hardware, and operating systems
- Learn by doing: hands-on activities and labs help students become familiar with how to safely and securely install, configure, maintain, upgrade, and troubleshoot computer systems
- Anytime learning: course text, assignments, quizzes, and discussions are supported on mobile devices
- Immediate feedback on assessment questions helps students monitor progress and reinforces learning
- Helps students prepare for CompTIA A+ certification exams
- Supports development of career skills needed to succeed in entry-level IT jobs

Prerequisites:
Although there are no prerequisites for this course, keyboarding and a strong interest in computers are recommended.

Target Audience:
- Entry level cable personnel
- Customer Service Representatives
- Broadband Premises Installers
- Headend Technicians
- IT personnel

Training includes:
- Easy-to-navigate graphical user interface
- 14 chapters, modifiable chapter quizzes and chapter exams
- 29 Interactive Activities
- 6 Packet Tracer activities. PT 6.2 or higher is required
- 99 hands-on and paper-based labs
- 1 skills assessment using equipment to verify the development of course skills
- 1 pre-test, 1 practice final exam, 2 final exam forms with field test pool items.
- 2 Certification Practice Exams, one for A+ 901 and one for A+ 902
- 14 chapters containing accessible text and media transcripts.
- 14 videos with closed captioning (CC) answer your questions throughout the program

Requirements for Successful Course Completion:
- Chapter Assessments 70% or higher
- Checkpoint Assessment 70% or higher
- Final exam 70% or higher
- Complete Feed Back
- Complete Hands-on Skill Labs Assigned by Instructor

You may take an assessment, practice final or final exam in each course up to 2 times
Format and Schedule:

The course is delivered online via the SCTE virtual classroom over **12 weeks**, during which participants view web based course materials, perform exercises and complete labs and assessments at a time that is convenient for them.

*NOTE: This is a self-paced course, and as a result, participants can contact the instructor when they have questions.*

Participants spend approximately 70 hrs over the 12 weeks, with **4-5 hours** per week, on average, completing the various course activities in order to maximize the learning benefits. 100% of the schedule is determined by the participant (viewing online materials, completing labs and exams) A live, online orientation is scheduled on the first day of the class.

System Requirements: A high speed Internet connection, Internet browser with flash. For tablet access, the iSwifter application or equivalent can be used to view the flash modules.

Upon Successful Course Completion Participants will Receive

- Course Completion Certificate
- 3 college credit hours when registered with an SCTE college partnership
- 6 Recertification Units (RUs) towards SCTE certification renewal

Course Chapters:

Chapter 1: Introduction to the Personal Computer  
Chapter 2: Introduction to Lab Procedures and Tool Use  
Chapter 3: Computer Assembly  
Chapter 4: Overview of Preventive Maintenance  
Chapter 5: Windows Installation  
Chapter 6: Windows Configuration and Management  
Chapter 7: Networking Concepts  
Chapter 8: Applied Networking  
Chapter 9: Laptops and Mobile Devices  
Chapter 10: Mobile, Linux and OS X Operating Systems  
Chapter 11: Printers  
Chapter 12: Security  
Chapter 13: The IT Professional  
Chapter 14: Advanced Troubleshooting

Learning Objectives:

Upon completion of the IT Essentials course, students will be able to perform the following tasks:

- Select the appropriate computer components to build, repair, or upgrade personal computers.
- Explain how to correctly use tools and safely work in a lab.
- Install components to build, repair, or upgrade personal computers.
- Explain how to perform preventive maintenance and troubleshooting on personal computers.
- Install Windows operation systems.
- Perform management and maintenance of Windows operating systems.
• Configure computers to communicate on a network.
• Configure devices to connect to the Internet and Cloud services.
• Explain how to use, configure, and manage laptops and mobile devices.
• Explain how to configure, secure and troubleshoot mobile, OS X, and Linux operating systems.
• Install and share a printer to meet requirements
• Implement basic host, data, and network security.
• Explain the roles and responsibilities of the IT professional.
• Troubleshoot advanced hardware and software problems

Chapter Content:

Chapter-1: Introduction to the Personal Computer
• Learn how power supplies operate
• Explore a longtime principle known as Ohm’s Law
• CPU architecture defined
• Cooling systems explained
• Investigate various forms of memory in a PC
• Explore PC components and how they interact with each other
• Learn about specialized computer systems

Chapter 2: Introduction to Lab Procedures and Tool Use
• Learn about personal and equipment safety
• Define Electro-Static Discharge (ESD) and Electro-Magnetic Interference (EMI)
• Explore hardware tools and software tools
• Investigate electronic test equipment such as a multi-meter

Chapter 3: Computer Assembly
• Learn how to install a power supply
• Learn what a mother-board is and how to install it and associated memory
• Learn about hard drives and optical drives and then – install them!
• Learn about adapter cards and Network Interface Cards (NICs)
• Explore all the cables used in PC systems
• Define Power On Self Test (POST), Unified Extensible Firmware Interface (UEFI) and Basic Input/Output System (BIOS)
• Learn how to configure BIOS and UEFI
• Explore upgrade methods, such as: BIOS, Central Processor Unit (CPU), Random Access Memory (RAM) and hard drives

Chapter 4: Overview of Preventive Maintenance
• Explore various tasks performed to maintain a computer and the components the tasks focus on
• Learn various trouble shooting methods when things are not working as they should
• Outline troubleshooting steps by isolating problem areas
• Explore common problems that arise in computers and learn the most probable solutions

Chapter 5: Windows Installation
• Define operating system (OS) terms
• Explore different OS types
• Investigate various OS requirements
• Learn how to upgrade OS
• Learn how to install OS by partitioning drives and working with file systems
• Explore PC boot-up processes, by working with the BIOS, startup modes and registries
• Define multi-boot OS and learn the various forms found in PCs
• Learn what directories are and how to use them
Chapter 6: Windows Configuration and Management
- Learn how the Graphical User Interface (CUI) works and explore the desktop, startup menu task manager and explorer
- Describe the control panel, folder options, Action Center and power options
- Work with disk defragmentation and general hard drive maintenance
- Investigate Windows command line
- Define virtual PC by way of Hypervisor
- Learn how update PCs and using scheduling to accomplish this, and also how create restoration points

Chapter 7: Networking Concepts
- Explore the devices found in computer networks
- Define various network topologies from Local Area Networks (LANs) to Metropolitan Area Networks (MANs)
- Define the OSI and TCP/IP models
- Learn how encapsulation operates and what occurs at each layer of the OSI model
- Investigate Ethernet standards for both wired and wireless networks
- Learn how IPv4 and IPv6 addressing is used in networks
- Define Transport Layer protocols such as User Datagram Protocol (UDP) Transmission Control Protocol (TCP) and when each one is used over another
- Learn how port numbers are used in PCs

Chapter 8: Applied Networking
- Configure NICs, both wired and wireless
- Explore network sharing concepts such as: Homegroup and Vista
- Learn how to map network drives
- Explore Virtual Private Networks (VPNs)
- Explore various broadband technologies from DSL to satellite
- Explore cloud services
- Learn network services such as DHCP, DNS, E-Mail, Authentication and IPS firewalls
- Lear various troubleshooting methods

Chapter 9: Laptops and Mobile Devices
- Explore more about laptops such as special function keys, various displays types and accessories – external or internal
- Configure power settings and wireless settings on a laptop
- Learn how to replace various hardware pieces
- Explore what is inside a mobile device
- Learn various maintenance techniques for both laptops and mobile devices

Chapter 10: Mobile, Linux and OS X Operating Systems
- Learn various mobile device OS platforms such as iOS and Android
- Investigate mobile device security software
- Define Bluetooth and Mobile synchronization
- Configure e-mail on a mobile device
- Explore Linux and OS X operating systems
- Explore Command Line Interface (CLI) commands
- Learn troubleshoot techniques for mobile devices

Chapter 11: Printers
- Explore common features and various types of printers
- Install printer drivers and optimize them
- Learn how to share printers in a network via wired and wireless methods
- Learn how preventive maintenance intensive printers can be

Chapter 12: Security
- Learn what forms of security threats there are, such as: Malware, SPAM, TCP/IP attacks, Zero-Day attacks and Social Engineering
• Explore security policies
• Define web security measures such as: ActiveX, Pop-Up blockers and SmartScreen Filters
• Explore securing access to data such as: firewalls, biometrics, data encryption and file permissions
• Learn how to protect devices from malicious attacks
• Learn how to secure both wired and wireless networks
• Explore physical security measures

Chapter 13: The IT Professional
• Explore various IT communication skills and some best practices for companies to follow
• Explore what it means to work with a customer
• Define computer forensics and chain of custody
• Learn about ethical and legal best practices that an IT department can utilize
• Define call center positions such as Level One and Level Two technical support

Chapter 14: Advanced Troubleshooting
• Learn techniques related to troubleshoot PC components and peripherals
• Learn various OS methods of troubleshooting
• Explore network issues
• Learn what to do when security fails

Optional Equipment (Not Required to Complete the Course):

Lab PC Hardware Requirements:
• PC Tower Case with 450W power supply
• PCI, PCIE, or AGP-compatible motherboard
• 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
• Cooling fan and heat sink
• 1 gigabyte (GB) RAM (Windows 7 32-bit) or 2 GB RAM (Windows 7 64-bit) (2 X 512 MB or 2 X 1GB suggested)
  o Some labs will require one module of RAM to be uninstalled or the simulation of a faulty module for troubleshooting purposes.
  o 1 GB is the minimum requirement to run the full functions of Windows 7 Professional
• Floppy drive
• 60 GB hard drive (minimum); 80 GB or more (recommended)
  o The system must support a full install of Windows 7 and two partitions of the same size.
• 1 DVD-ROM (minimum) or CD/DVD Burner (recommended)
• Ethernet card
• PCI, PCIE (recommended), or AGP video card
• DirectX 9 graphics device with WDDM 1.0 or higher driver
• Ribbon cables to connect HDD/CD/Floppy
• Mouse
• Keyboard
• Super VGA (1024 X 768) or higher-resolution video monitor

Tool Kit:
• Safety glasses or goggles
• Electrostatic discharge (ESD) wrist strap or antistatic mat
• Flat, torx, hex and phillips head drivers
• Wire cutters
• Needle nose pliers
- Cable strippers
- Part retriever (or tweezers or needle nose pliers)
- Thermal compound
- Electronics cleaning solution
- Compressed air can
- Cable ties
- Parts organizer or plastic tub for storing computer parts
- Older PC with hard drive installed
  - Windows XP or Vista Installation CD
  - With 2 or more RAM modules
  - Additional PCI NIC with driver
  - Additional HD
  - Antistatic bags for electronic parts
- Multi-meter
- LAN Cable Tester
- LAN Coupler
- Category #5 straight jumpers (2)
- Category #5 crossover jumpers (2)
- Network Loop back plugs

Network Equipment:
- Wireless router/switch
- Old Hub or switch
- Wireless adapter