Printed on: 09-23-2016 05:48 PM

CTE IT Essentials 1

John F. Kennedy High School (051089)

Submitted: Sep 12, 2016
Decision: Sep 23, 2016
APPROVED

Basic Course Information

Title:

CTE IT Essentials 1

Transcript abbreviations:

IT Essentials

Length of course:

Full Year

Subject area:

College-Preparatory Elective ("g") / Interdisciplinary

Integrated (Academics / CTE)?

Yes

Grade levels:

10th, 11th, 12th

UC honors designation?

No

Course learning environment:

Classroom Based, Online

Course Description

Course overview:

Information Technology Essentials is the study of the concepts of physics, electronics, mathematics, and engineering as applied to the information infrastructure present in today's connected society. Students gain a technical understanding of computer technology, networking and security, as well as the communication skills and professionalism now required of all entry-level IT professionals. Concepts studied will include basic electronics, digital electronics concepts, binary and hex representation of numbers, and concepts of network information transport.

Prerequisites:

Algerbra 1 (Required)

Co-requisites:

None

Course content:

Course Content

Information Technology Essentials is an integrated science course elective taught in concert with the IT department of a local community college, Los Angeles Mission College (LAMC). Instructors have designed the courses to align with LAMC Computer Science courses CSIT 453, and students completing this course will receive credit for these courses. This LAMC course is UC:CSU approved.

Students will expand their knowledge of science as it applies to the study of information systems by building on their knowledge of physics and mathematics through real-world hands-on labs and practical study of the hardware and software systems involved in the modern computer and network systems. Both academic and technical skills will be engaged and this course will prepare and motivate students to pursue further courses in information technology. The class will also inform students of the different routes they can take to achieve their career goals, including community colleges, trade schools, as well as 4 year college IT programs.

Students will learn the content through a mixture of traditional lecture time, computer lab time, projects, and online resources. Lab time will concentrate on developing familiarity with both computer and network software and diagnostic tools, which will develop students' critical thinking and problem solving skills.

Formative and summative assessments will be used to measure student performance. These assessments will include a variety of assignments, projects, and hands-on experience, such as:

Student demonstrations

Written examinations

Laboratory projects

Online assessments

Small Business Network Simulation

By the end of the course, students will be able to complete the following objectives:

- Understand the relationship of electronics, mathematics and logic as related to the design and operation of computer and networking systems.
- Utilize project developed learning strategies to develop student's critical thinking and problem solving skills.
- Understand how to identify the key elements of a problem and devise a strategy, by using the elements of a troubleshooting process, to solve them.
- Conduct independent research and correctly utilize hardware and software tools to explore problems and develop possible solutions.
- Apply good communications skills and professional behavior while working with customers and other professionals
- Perform preventive maintenance and apply advanced troubleshooting techniques to solve common system issues.
- Assess customer needs, analyze possible configurations, and provide solutions or recommendations for hardware, operating systems, networking, and security
- Create a schematic layout of an computer repair workshop utilizing business diagramming software

Unit 0: Introducition to the Information Technology Industry
This chapter defines and describes the importance of the Information Technology field and how Information and Communication Technologies (ICT) and its various pathways play work together. Students learn about the various governing bodies and standards organizations. Students are also introduced to the online curriculum and how to navigate through the website and how to access resources.

Key Activity: Introduction to the online curriculum and navigation techniques.

Unit 1: Introduction to the Personal Computer
A thorough study of the hardware specific to the typical desktop computer. Concepts of digital hardware and devices covered, as well as an introduction to electronic principles such as Ohm's law. Concepts of binary and hexadecimal numbers covered. Students will be shown a system by system analysis of a typical computer including software, hardware and firmware components and their interaction.

Key Activities: Review the components of a basic personal computer system; Ohn's Law worksheet; Binary, Hex, and Decimal Worksheet;

Practical Exam: Identifying and specifying components of sample personal computer.

Writing Activity: Devise and complete a hardware inventory sheet.

Unit 2: Lab Procedures and Tool Use

This chapter covers basic safety practices for the workplace, hardware and software tools, and the disposal of hazardous materials. Safety guidelines help protect individuals from accidents and injury. Follow electrical safety guidelines to prevent electrical fires, injuries, and fatalities. They also help to protect equipment from damage. Some of these guidelines are designed to protect the environment from contamination caused by improperly discarded materials. Students will be taught safe lab procedures and the importance of communication and awareness in the lab. Demonstrate safe lab procedures, proper tool use, and how to assemble a personal computer; Explain the of safe working conditions and safe lab procedures; Identify tools and software used with personal computers

Key Activity: Reading and analyzing a Material Data Safety Sheet Activity: (MSDS)

Unit 3: Computer Assembly

The practical hands-on side IT will be emphasized in this chapter. Students will disassemble and reassemble a working computer using their knowledge gained in the previous chapter. Problem solving skills and safe lab technique will be emphasized. This chapter also discusses the importance of component compatibility. It also covers the need for adequate system resources to efficiently run the customer's hardware and software.

Key Activities: Build a computer; Boot the computer for the first time; Upgrade and configure components in a computer system to meet a customer's requirements; Using troubleshooting procedure and analytical skills to repair a nonoperational computer: Using communication skills to determine customer's needs and correctly selecting computer components.

Unit 4: Overview of Preventive Maintenance and Troubleshooting

In this chapter, general guidelines for troubleshooting procedures and creating preventive maintenance programs are covered. These guidelines are a starting point to help technicians develop your preventive maintenance and troubleshooting skills. Analytical skills will be developed in this chapter by having student study typical computer environments and suggest appropriate strategies to maximize the utility and uptime of mission critical systems.

4.1: Preventive Maintenance: Analytical skills will be developed in this chapter by having student study typical computer environments and suggest appropriate strategies to maximize the utility and uptime of mission critical systems.

4.2: Troubleshooting Process

Key Activities: Explain the purpose of and basic rules of preventive maintenance and the troubleshooting process; Describe the purpose and benefits of preventive maintenance for personal computers; Identify the steps of the troubleshooting process and perform basic PC troubleshooting; Utilizing analytical skills, logical thinking and communication techniques to identify problem areas and suggest possible solutions for real world customer scenarios. Use of various open-ended and close-ended questions, and the appropriate situations to use them in.

Unit 5: Operating Systems

Logical thinking and problem solving skills will be emphasized in the analysis and troubleshooting of a modern operating system. The concepts and functions involved in modern operating system will be explored, with an emphasis on the interaction of the electronic hardware components and their associated software drivers and

subsystems. Common Preventive Maintenance Techniques for Operating Systems.

- Install and use an operating system
- Explain the purpose of an operating system
- Perform an operating system installation
- Explore common tools and applets of the Windows GUI
- Explain clientside virtualization
- Identify and apply common preventive maintenance techniques for operating systems
- Basic operating systems troubleshooting

Key Activity: Using advanced analysis and logical thinking to identify and troubleshoot operating system problems. Students will be asked to solve various problem scenarios by using their previous knowledge to correctly identify and diagnose the operating system problem, and then use their previously learned problem solving technique to implement a solution.

Unit 6: Operating Systems Configuration and Management

In this chapter, technicians learn how to navigate the Windows GUI. Also covered is how to use the Control Panel and other tools to keep Windows operating systems running smoothly. Configuration and testing of various Internet Options is demonstrated.

Key Activity: Using Task Manager to turn on/off certain services; install and uninstall/changing software and Apps. Create User Accounts; User control access of passwords, images and account types.

Unit 7: Networks Concepts

This unit provides an overview of network principles, standards, and purposes. To meet the expectations and needs of your customers and network users, IT professionals become familiar with networking concepts. Technicians will learn the basics of network design and how some components affect the flow of data on a network. This knowledge will help you successfully design, implement, and troubleshoot networks.

The concepts of the modern Internet will be explored with an emphasis on the logical and electronic structure. The previously learned concepts of binary and hexadecimal representation will be used in the exploration of Internet addressing. Electrical and logical analysis of the Ethernet protocol will be explored. Students will use abstract reasoning to evaluate theOSI andTCP/IP models, and well as concepts of Internet protocols. Explain the principles of networking; Describe types of networks; Describe basic networking concepts and technologies; Describe physical components of a network; Describe network topologies; Describe Ethernet standards; Identify names, purposes, and characteristics of other technologies used to establish connectivity; Identify and apply common preventive maintenance techniques used for networks.

Key Activities: Use of Internet tools to make clear typical network topologies and Internet addressing. Using critical thinking and problem solving skills to identify and correct typical networking problems.

Unit 8: Applied Networking

This unit focuses on applied networking. Technicians learn how to install and configure network interface cards (NICs), connect devices to a wireless router, and configure a wireless router for network connectivity. Students also learn how to configure domain memberships in Windows and share files through network shares and drive mapping. A large part of your networking skills includes the ability to decide which Internet Service Provider (ISP) to use for home or small office networks.

Networks and the Internet provide many important services. Students learn about data centers and the benefits of Cloud computing. Students also explore some of the more important network applications including web, email, file, proxy, and security services. Finally, students will learn how to apply a systemic method for troubleshooting.

Key Activities: Utilizing the Operating Systems Device Manager to troubleshoot Network Interface Card (NIC) issues and correct them. Connect to a and log into a wireless router. Utilize the IPCONFIG command from the Windows Command Prompt.

Unit 9: Laptops and Mobile Devices

This unit focuses on many features of laptops, mobile devices, and their capabilities. Students learn that laptops run the same operating systems as desktop computers and most come with built in Wi-Fi, webcam, microphone, speakers, and ports to attach external components. Students learn that like a desktop or laptop computer, mobile devices use an operating system to run applications (apps), games, and play movies and music. Mobile device also have different CPU architecture, designed to have a reduced instruction set when compared to laptop and desktop processors. Troubleshooting and App installation techniques are covered and compared.

Key Activities: Using knowledge from previous exploration of Internet concepts to study the software and hardware systems that connect mobile devices.; Using knowledge obtained from previous chapters, and the logical and problem solving skills developed, troubleshoot a series of typical laptop malfunctions.

Unit 10: Mobile, Linux and OS X Operating Systems

This unit focuses on the two most commonly used mobile operating systems: Android and iOS. Android is developed by Google, and iOS is developed by Apple. The operating system (OS) controls almost all functions on a computer. In this chapter, you learn about the components, functions, and terminology related to mobile operating systems, Linux, and OS X. Before users can analyze and modify software, they must be able to see the source code. Source code is the sequence of instructions that is written in human readable language, before it is turned into machine language (zeroes and ones). Students learn about Open Source code and its advantages in today's mobile environment.

Key Activities: Working with Adroid Applications to place apps and widgets on the home screen; create folders and move between screens. Working with iOS, students will place apps on the home screen and move them between different home screens. You will also create folders. Finally, you will install on the iOS device and uninstall them.

Unit 11: Printers

This unit provides essential information about printers. You will learn how printers operate, what to consider when purchasing a printer, and how to connect printers to an individual computer or to a network. Students understand the operation of various types of printers to be able to install and maintain them, as well as troubleshoot any problems that arise. Technicians will learn how to install, use, and share a printer; describe the features that are common to most printers; describe different types of printers; Install and configure a printer; troubleshoot printer and how to utilize knowledge of the technologies involved and the key positive and negative factors of each, recommend and implement an appropriate printer for a typical office environment.

Key Activities: Use appropriate communication techniques to interview a client and determine their needs. Use business writing skills, write up a proposal.

Unit 12: Security

Using skills developed in the understanding of operating systems and networking chapters, study the vulnerabilities and strategies involved in understanding hardware and software security and implementing effective techniques to secure both personal and business environments. Students learn to identify various security threats within their environment and how to implement preventive maintenance techniques for security.

Key Activities: Describe attacks that threaten the security of computer equipment and data, and how to mitigate those threats; Describe security threats; Identify security procedures; Identify common preventive maintenance techniques for security; Troubleshoot security issues as they pertain to an office environment; Using analytical skills developed in this chapter, identify typical security threats and suggest appropriate strategies to protect from them. Use communication skills to write a report on implementing the project.

Unit 13: The IT Professional

This unit will explain the expectations and responsibilities of the IT Professional. The IT Professional needs to be more than a technician, he needs to be aware of the ethical and legal aspects of the trade. He also needs to have excellent communication skills and deport himself in a business like manner. Students learn about Communication Skills and when these Soft Skills are most important; Ethical and Legal Issues in the IT Industry and how to handle themselves if they are Call Center Technicians.

Key Activities: Explain why good communication skills are a critical part of IT work; Explain legal and ethical issues that arise in the IT industry and appropriate behaviors when faced with these issues; Describe the call center environment and technician responsibilities; Using good writing technique and proper usage of Internet resources, write an appropriate computer usage policy for a small business.

Unit 14: Advanced Troubleshooting

The final unit of the course concentrates on developing the problem solving skills developed by the student in the course of the class. Advanced problems incorporating deeper concepts will be concentrated on, with the emphasis on the students finding their own strategies and communicating a logical sequence of problem solving (Six Steps for Troubleshooting)steps, and then implementing and accurately documenting them.

Key Activity: Diagnose and resolve advanced hardware and software problems; Troubleshoot computer components and peripherals; Troubleshoot operating systems, networks, laptops, printers and security; Troubleshoot problems remotely, Summative practical assessment on troubleshooting of real world computer

and/or Internet problems

Title	Author(s)/Editor(s)/Compiler(s)	Publisher(s)	Affiliated Institution or Organization	Edition	Website URL	Read in entirety

Course Materials

Manuals

Title	Author	Publisher	Edition	Website	Read in entirety
Computer Service and Repair	Richard M. Roberts	Goodheart-Wilcox	4th Edition	www.g-w.com	No

Websites

Title	Author(s)/Editor(s)/Compiler(s)	Affiliated Institution or Organization	URL
Cisco Networking Academy	Cisco Systems	Cisco Systems Inc.	https://www.netacad.com/

Additional Information

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