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CTE IT Essentials

Culver City High School (050715)

Basic Course Information

Abbreviations:

Abbreviation	Course code
IT Essentials	

Length of course:

Full Year (2 semesters; 3 trimesters; 4 quarters)

Subject area:

Subject area	Discipline
College-Preparatory Elective ("g")	Interdisciplinary

UC honors designation:

None

Grade levels:

9th	10th	11th	12th
		✔	✔

Course learning environment:

Classroom	Online
✔	✔

Is this course an integrated course?

Yes

Course Description

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. In particular the science of electronic technology and the mathematical and logical structure of computing and networking systems will be explored in depth. Concepts studied will include basic electronics, digital electronics concepts, binary and hex representation of numbers, and concepts of network information transport.

Prerequisites:

Prerequisite	Required / Recommended
Algebra 1	Required

Co-requisites:

Corequisite	Required / Recommended
Physics	Recommended

Course content:

Course Objectives

Information Technology Essentials is an integrated science course elective taught in concert with the IT department of a local community college, West Los Angeles College (WLAC). Instructors have designed the courses to align with WLAC Computer Science courses CSIT 901 and 902, and students completing this course will receive credit for these courses. These WLAC courses are 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

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
- Perform preventive maintenance and advanced
- Assess customer needs, analyze possible configurations, and provide solutions or recommendations for hardware, operating systems, networking, and security

Unit 0: Introducing the Information Technology Industry.
This chapter defines the IT industry and explains the various governing bodies and standards organisations. It also introduces the navigation features of the online curriculum.

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.

Chapter 1: **Review the components of a basic personal computer system**

Key Activities:

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

Safety and awareness in the lab is critical. Students will be taught safe lab procedures and the importance of communication and awareness in the lab.

Lab Procedures and Tool Use	**Demonstrate safe lab procedures, proper tool use, and how to assemble a personal computer**
2.1: Safe Lab Procedures: Safety and awareness in the lab is critical. Students will be taught safe lab procedures and the importance of communication and awareness in the lab.	Explain the of safe working conditions and safe lab procedures
2.2: Proper Use of Tools	Identify tools and software used with personal computers
Key Activity:	**Reading and analyzing a Material Data Safety Sheet (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.

3.1: Computer Assembly:	**Build a computer**
3.2: Boot the Computer	Boot the computer for the first time
3.3: Upgrading and Configuring a PC	Upgrade and configure components in a computer system to meet a customer's requirements
	Using troubleshooting procedure and analytical skills to repair a non-operational computer.
Key Activities:	**Using communication skills to determine customer's needs and correctly selecting computer components.**

Unit 4: Overview of Preventive Maintenance and Troubleshooting
Analytical skills will be developed in this chapter by having student study typical computer environments and suggest appropriate strategies to maximize the utility and up-time of mission-critical systems.

Chapter 4: Overview of Preventative Maintenance and Troubleshooting	**Explain the purpose of and basic rules of preventive maintenance and the troubleshooting process**
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.	Describe the purpose and benefits of preventive maintenance for personal computers
4.2: Troubleshooting Process	Identify the steps of the troubleshooting process and perform basic PC troubleshooting
Key Activities:	**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.

Chapter 5: Operating Systems	**Install and use an operating system**
5.1: Modern Operating Systems:	Explain the purpose of an operating system
5.2: Operating System Installation	Perform an operating system installation
5.3: The Windows GUI and Control Panel	Explore common tools and applets of the Windows GUI
5.4: Client-Side Virtualization	Explain client-side virtualization
5.5: Common Preventive Maintenance Techniques for Operating Systems	Identify and apply common preventive maintenance techniques for operating systems
5.6: Basic OS Troubleshooting	Troubleshoot operating systems

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: Networks and the Internet

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 the OSI and TCP/IP models, and well as concepts of internet protocols.

Chapter 6: Networks	**Introduce network principles, standards, and purposes**
6.1: Principles of Networking:	Explain the principles of networking
6.2: Identifying Networks	Describe types of networks
6.3: Basic Networking Concepts and Technologies	Describe basic networking concepts and technologies
6.4: Physical Components of a Network	Describe physical components of a network
6.5: Network Topologies	Describe network topologies
6.6: Ethernet Standards	Describe Ethernet standards
6.7: OSI and TCP/IP Data Models	Explain OSI and TCP/IP data models
6.8: Computer to Network Connection	Connect a computer to a wired network and a wireless network
6.9: Select an ISP Connection Type	Identify names, purposes, and characteristics of other technologies used to establish connectivity
6.10: Common Preventative Maintenance Techniques Used for Networks	Identify and apply common preventive maintenance techniques used for networks
6.11: Basic Troubleshooting Process for Networks	Troubleshoot 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 7: Laptops

Using knowledge from chapter 1, the electrical and software structure will be compared and extended to the laptop architecture.

Chapter 7: Laptops	**Review the components of a basic laptop**
7.1: Laptop Components:	Describe the purpose of laptop features
7.2: Laptop Display Components	Describe laptop display components
7.3: Laptop Power	Describe how to configure laptop power settings
7.4: Laptop Wireless Communication Technologies	Describe laptop wireless communication technologies
7.5: Laptop Hardware and Component Installation and Configuration	Describe the removal and installation of laptop components
7.6: Common Preventive Maintenance Techniques for Laptops	Identify common preventive maintenance techniques for laptops
7.7: Basic Troubleshooting for Laptops	Troubleshoot laptops
Key Activity:	**Using knowledge obtained from previous chapters, and the logical and problem solving skills developed, troubleshoot a series of typical laptop malfunctions.**

Unit 8: Mobile Devices

An extension of the concepts learned in previous chapters to devices with different hardware and software systems. Exploration of the various technologies that enable the modern connected society.

Chapter 8: Mobile Devices	**Describe the many features and capabilities of mobile devices**
8.1: Mobile Device Hardware Overview:	Explain mobile device hardware
8.2: Mobile Device Operating Systems	Describe the features and characteristics of mobile operating systems
8.3: Network Connectivity and Email	Establish basic network connectivity and configure email
8.4: Methods for Securing Mobile Devices	Compare and contrast methods for securing mobile devices
8.5: Basic Troubleshooting for Mobile Devices	Troubleshoot mobile devices
Key activity:	**Using knowledge from previous exploration of internet concepts to study the software and hardware systems that connect mobile devices.**

Unit 9: Printers

Exploration of the technology behind the most important output device in the business environment.

Chapter 9: Printers	**Install, use, and share a printer**
9.1: Common Printer Features: Exploration of the technology behind the most important output device in the business environment.	Describe the features that are common to most printers
9.2: Types of Printers	Describe different types of printers
9.3: Installing and Configuring Printers	Install and configure a printer
9.4: Sharing Printers	Describe printer sharing procedures and share a printer
9.5: Preventive Maintenance Techniques for Printers	Describe preventive maintenance techniques for a printer
9.6: Basic Troubleshooting for Printers	Troubleshoot printers
Key Activity:	**Using knowledge of the technologies involved and the key positive and negative factors of each, recommend and implement an appropriate printer for a typical**

**business environment. Use appropriate
communication techniques to interview a client and
determine their needs.**

Using business writing skills, write up a proposal.

Unit 10: 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.

Chapter 10: Security	**Describe attacks that threaten the security of computer equipment and data, and how to mitigate those threats**
10.1: Security Threats: 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.	Describe security threats
10.2: Security Procedures	Identify security procedures
10.3: Common Preventive Maintenance Techniques for Security	Identify common preventive maintenance techniques for security
10.4: Basic Troubleshooting Process for Security	Troubleshoot security
Key Activity:	**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 11: 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.
This unit will explain the expectations and responsibilities of the IT Professional.

Chapter 11: The IT Professional	**Describe the roles and responsibilities of the IT professional**

11.1: Communication Skills and the IT Professional	Explain why good communication skills are a critical part of IT work
11.2: Ethical and Legal Issues in the IT Industry	Explain legal and ethical issues that arise in the IT industry and appropriate behaviors when faced with these issues
11.3: Call Center Technicians	Describe the call center environment and technician responsibilities
Key Activity:	Using good writing technique and proper usage of internet resources, write an appropriate computer usage policy for a small business.

Unit 12: 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 steps, and then implementing and accurately documenting them.

Chapter 12: Advanced Troubleshooting	**Diagnose and resolve advanced hardware and software problems**
12.1: Computer Components and Peripherals	Troubleshoot computer components and peripherals
12.2: Operating Systems	Troubleshoot operating systems
12.3: Networks	Troubleshoot networks
12.4: Laptops	Troubleshoot laptops
12.5: Printers	Troubleshoot printers
12.6: Security	Troubleshoot security
Key Activity:	**Summative practical assessment on troubleshooting of real world computer and/or internet problems.**

Course Materials

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/

A-G Guide (http://www.ucop.edu/agguide/) | Contact Us (/agcourselist#/contact)