

# Course Outline

Information and Communication Technologies

REVISED: August/2017

**Job Title:**  
Computer Technician

**Career Pathway:**  
Networking

**Industry Sector:**  
Information and Communication  
Technologies

**O\*NET-SOC CODE:**  
15-1151.00

**CBEDS Title:**  
Network Engineering

**CBEDS No.:**  
4604

**74-15-70**

**A+ Certification/3**

**Credits:** 15

**Hours:** 180

**Course Description:**

This competency-based course is the last in a sequence of three designed for computer installation, preventive maintenance, networking, security, and troubleshooting. It provides students with project-based experiences in basic computer and peripheral servicing. Technical instruction includes an introduction, reviews of resource management and computer math, and basic entrepreneurship. Emphasis is placed on networking technologies/devices/protocols, basic security concepts and technologies, and troubleshooting, repair, and maintenance techniques and their relevance to the structure and function of a computer system. The competencies in this course are aligned with the California High School Academic Content Standards and the California Career Technical Education Model Curriculum Standards.

**Prerequisites:**

Enrollment requires successful completion of the A+ Certification/2 (74-15-60) course.

**NOTE:** For Perkins purposes this course has been designated as a **capstone** course.

Meets CompTIA A+ Essentials Certification requirements.

This course cannot be repeated once a student receives a Certificate of Completion.



## **COURSE OUTLINE COMPETENCY-BASED COMPONENTS**

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (Education Code Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

### **COURSE OUTLINE COMPONENTS**

### **LOCATION**

#### **GOALS AND PURPOSES**

Cover

The educational goals or purposes of every course are clearly stated and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course, and are written to be understandable by a prospective student.

#### **PERFORMANCE OBJECTIVES OR COMPETENCIES**

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Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition and In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction and assessment in competency-based education are: explicit, known, agreed upon, integrated, performance oriented, and adaptive.

**COURSE OUTLINE COMPETENCY-BASED COMPONENTS**  
**(continued)**

**COURSE OUTLINE COMPONENTS**

**LOCATION**

**INSTRUCTIONAL STRATEGIES**

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Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom.

Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Adults with Disabilities.

**UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT**

Cover

The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level.

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Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit.

**EVALUATION PROCEDURES**

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The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved.

Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, and simulations), paper and pencil exams, and standardized tests.

**REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT**

Cover

After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time.

## ***ACKNOWLEDGMENTS***

Thanks to PAUL PIDOUX and MARCELA BAKER for developing and editing this curriculum. Acknowledgment is also given to ERICA ROSARIO for designing the original artwork in the course cover designs.

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# **CALIFORNIA CAREER TECHNICAL EDUCATION MODEL CURRICULUM STANDARDS**

## ***Information and Communication Technologies Industry Sector***

### ***Knowledge and Performance Anchor Standards***

#### **1.0 Academics**

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the Information and Communication Technologies academic alignment matrix for identification of standards.

#### **2.0 Communications**

Acquire and accurately use Information and Communication Technologies sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

#### **3.0 Career Planning and Management**

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

#### **4.0 Technology**

Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the Information and Communication Technologies sector workplace environment.

#### **5.0 Problem Solving and Critical Thinking**

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the Information and Communication Technologies sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

#### **6.0 Health and Safety**

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to the Information and Communication Technologies sector workplace environment.

#### **7.0 Responsibility and Flexibility**

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the Information and Communication Technologies sector workplace environment and community settings.

#### **8.0 Ethics and Legal Responsibilities**

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

#### **9.0 Leadership and Teamwork**

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution such as those practiced in the Future Business Leaders of America and SkillsUSA career technical student organization.

#### **10.0 Technical Knowledge and Skills**

Apply essential technical knowledge and skills common to all pathways in the Information and Communication Technologies sector, following procedures when carrying out experiments or performing technical tasks.

#### **11.0 Demonstration and Application**

Demonstrate and apply the knowledge and skills contained in the Information and Communication Technologies anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and through career technical student organizations such as Future Business Leaders of America and SkillsUSA.

## ***Information and Communication Technologies Pathway Standards***

### **B. Networking Pathway**

Students in the Networking pathway prepare for careers that involve network analysis, planning, and implementation, including the design, installation, maintenance, and management of network systems. The successful establishment, maintenance, and securing of information and communication technologies infrastructure is critical to the success of every twenty-first century organization. Employment continues to grow for persons with expertise in networking.

Sample occupations associated with this pathway:

- ◆ Computer Security Specialist
- ◆ Network Technician
- ◆ Network Engineer
- ◆ Network Administrator
- ◆ Telecommunication Specialist

- B1.0 Identify and describe the principles of networking and the technologies, models, and protocols used in a network.
- B2.0 Identify, describe, and implement network media and physical topologies.
- B3.0 Install, configure, and differentiate between common network devices.
- B4.0 Demonstrate proper network administration and management skills.
- B5.0 Demonstrate how to communicate and interpret information clearly in industry-standard visual and written formats.
- B6.0 Use and assess network communication applications and infrastructure.
- B7.0 Analyze a customer's organizational needs and requirements to identify networking needs.
- B8.0 Identify security threats to a network and describe general methods to mitigate those threats.

**CBE**  
**Competency-Based Education**

**COMPETENCY-BASED COMPONENTS**  
**for the A+ Certification/3 Course**

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>A. INTRODUCTION AND SAFETY</p> <p>Review, apply, and evaluate classroom and workplace policies and procedures used in accordance with federal, state, and local safety and environmental regulations.</p> <p>(4 hours)</p>	<ol style="list-style-type: none"> <li>1. Review the scope and purpose of the course.</li> <li>2. Review the overall course content as a part of the Linked Learning Initiative.</li> <li>3. Review classroom policies and procedures.</li> <li>4. Review classroom and workplace first aid and emergency procedures based on the American Red Cross (ARC) standards.</li> <li>5. Review the different occupations in the Engineering and Design Industry Sector which have an impact on the role of computer technicians.</li> <li>6. Review the opportunities available for promoting gender equity and the representation of non-traditional populations in computer technicians.</li> <li>7. Review the impact of Environmental Protection Agency (EPA) legislation on Engineering and Design Industry Sector Practices in protecting and preserving the environment.</li> <li>8. Review the demonstrate the procedures for contacting proper authorities for the removal of hazardous materials based on the EPA Standards.</li> <li>9. Review and demonstrate the use of the Material Safety Data Sheet (MSDS) as it applies to the computer technology industry.</li> <li>10. Review the provisions of the California Title 24 Energy Efficiency Standards (a.k.a 2008 California Green building Standards Code) as they relate to the Engineering and Design Industry Sector.</li> <li>11. V the California Occupational Safety and Health Administration (Cal/OSHA) and its laws governing computer technicians.</li> <li>12. Review how each of the following insures a safe workplace:               <ol style="list-style-type: none"> <li>a. Employees’ rights as they apply to job safety</li> <li>b. Employees’ obligations as they apply to safety</li> <li>c. Safety laws applying to electrical tools</li> <li>d. Proper use of static straps and static mats</li> </ol> </li> <li>13. Pass the safety exam with 100% accuracy.</li> </ol>	<p><b>Career Ready Practice:</b> 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12</p> <p><b>CTE Anchor:</b> Communications: 2.4, 2.5, 2.6 Career Planning and Management: 3.1, 3.3 Health and Safety: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11</p> <p><b>CTE Pathway:</b> B1.1, B4.7</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>B. RESOURCE MANAGEMENT REVIEW</p> <p>Review, apply, and evaluate the resource management principles and techniques in the computer repair and maintenance field.</p> <p>(1 hour)</p>	<ol style="list-style-type: none"> <li>1. Review the definitions of the following:               <ol style="list-style-type: none"> <li>a. resources</li> <li>b. management</li> <li>c. sustainability</li> </ol> </li> <li>2. Review the importance of managing the following in the computer repair and maintenance field:               <ol style="list-style-type: none"> <li>a. time</li> <li>b. materials</li> <li>c. personnel</li> </ol> </li> <li>3. List specific examples of effective management of the following in the computer repair and maintenance field:               <ol style="list-style-type: none"> <li>a. time</li> <li>b. materials</li> <li>c. personnel</li> </ol> </li> <li>4. Describe the following benefits of effective resource management in the computer repair and maintenance field:               <ol style="list-style-type: none"> <li>a. profitability</li> <li>b. sustainability</li> <li>c. company growth</li> </ol> </li> <li>5. Describe the economic benefits and liabilities of managing resources in an environmentally responsible way.</li> </ol>	<p><b>Career Ready Practice:</b> 1, 3, 5, 6, 7, 8, 9, 12</p> <p><b>CTE Anchor:</b> Communications: 2.1, 2.2, 2.3, 2.5 Career Planning and Management: 3.7 Technology: 4.1, 4.2 Problem Solving and Critical Thinking: 5.2, 5.4 Health and Safety: 6.10, 6.11 Responsibility and Flexibility: 7.1, 7.4, 7.6 Ethics and Legal Responsibilities: 8.1 Technical Knowledge and Skills: 10.1 , 10.10</p> <p><b>CTE Pathway:</b> B4.2, B4.6, B6.2, B7.1, B8.2</p>
<p>C. COMPUTER MATH REVIEW</p> <p>Review, apply, and evaluate the power of ten, metric prefixes, and the binary and hexadecimal number systems.</p>	<ol style="list-style-type: none"> <li>1. Review the powers of ten the decimal number system.</li> <li>2. Review the metric prefixes (engineering Prefixes) associated with computers.</li> <li>3. Review the binary number system.</li> <li>4. Review the conversion of decimal numbers to binary numbers.</li> <li>5. Review the conversion of binary numbers to decimal numbers.</li> <li>6. Review the hexadecimal number system.</li> <li>7. Review the conversion of decimal number to hexadecimal numbers.</li> <li>8. Review the conversion of hexadecimal numbers to decimal numbers.</li> <li>9. Review the conversion of hexadecimal number to binary numbers.</li> <li>10. Review the conversion of binary numbers to hexadecimal numbers.</li> </ol>	<p><b>Career Ready Practice:</b> 1, 3, 4, 8</p> <p><b>CTE Anchor:</b> Problem Solving and Critical Thinking: 5.1, 5.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12 Technical Knowledge and Skills: 10.6, 10.7</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(5 hours)	11. Review the American Standard Code for Information Interchange (ASCII) code. 12. Pass the written Computer Math exam with 80% or higher score.	Demonstration and Application: 11.1  <b>CTE Pathway:</b> B.1
<b>D. NETWORKING</b>  Understand, apply, and evaluate the basics of networking technologies, devices, and protocols.	1. Define and describe the following: <ol style="list-style-type: none"> <li>a. Networking</li> <li>b. Internet Protocol (IP)</li> <li>c. Configuration of IP addressing</li> <li>d. Transmission Control Protocol (TCP)</li> <li>e. TCP/Ip properties</li> <li>f. Bandwidth and latency</li> <li>g. Status indicators</li> <li>h. Protocols</li> <li>i. NETBIOS</li> <li>j. Full-duplex</li> <li>k. Half-duplex</li> <li>l. Workgroups</li> <li>m. Domains</li> <li>n. Common ports</li> <li>o. Hypertext Transfer Protocol (HTTP)</li> <li>p. File Transfer protocol (FTP)</li> <li>q. Post Office Protocol (POP)</li> <li>r. Simple Mail Transfer Protocol (SMTP)</li> <li>s. TELNET</li> <li>t. HyperText Transfer Protocol Secure (HTTPS)</li> <li>u. Local Area Network (LAN) /Wide Area Network (WAN)</li> <li>v. Hub</li> <li>w. Switch</li> <li>x. Router</li> <li>y. Virtual Private Networks (VPN)</li> <li>z. Class identification</li> </ol> 2. Describe how network cables and connectors are categorized and implemented: <ol style="list-style-type: none"> <li>a. Cables               <ol style="list-style-type: none"> <li>i. Plenum/Polyvinyl Chloride (PVC)</li> <li>ii. Unshielded twisted Pair (UTP) (e.g Category 3 (CAT3), CAT5/5e, CAT6)</li> <li>iii. Shielded Twisted Pair (STP)</li> <li>iv. Fiber</li> <li>v. Coaxial cable</li> </ol> </li> <li>b. Connectors               <ol style="list-style-type: none"> <li>i. Registered Jack 45 (RJ45)</li> <li>ii. RJ11</li> </ol> </li> </ol>	<b>Career Ready Practice:</b> 1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12  <b>CTE Anchor:</b> Problem Solving and Critical Thinking: 5.3 Technical Knowledge and Skills: 10.1, 10.5, 10.12  <b>CTE Pathway:</b> B1.1, B1.3, B1.5, B3.1

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(50 Hours)	<ol style="list-style-type: none"> <li>3. Compare and contrast the different network types:               <ol style="list-style-type: none"> <li>a. Broadband                   <ol style="list-style-type: none"> <li>i. Digital Subscriber Line (DSL)</li> <li>ii. Cable</li> <li>iii. Satellite</li> <li>iv. Fiber-optic</li> </ol> </li> <li>b. Dial-up</li> <li>c. Wireless                   <ol style="list-style-type: none"> <li>i. All IEEE 802.11 types</li> <li>ii. Wired Equivalent Private (WEP)</li> <li>iii. Wi-Fi Protected Access (WPA)</li> <li>iv. Service Set Identifier (SSID)</li> <li>v. Media Access Control (MAC) filtering</li> <li>vi. Dynamic Host Configuration Protocol (DHCP) settings</li> </ol> </li> <li>d. Bluetooth</li> <li>e. Cellular</li> </ol> </li> <li>4. Pass the written Networking exam with 80% or higher score.</li> </ol>	
<p>E. SECURITY</p> <p>Understand, apply, and evaluate the basic security concepts and technologies.</p>	<ol style="list-style-type: none"> <li>1. Define the following:           <ol style="list-style-type: none"> <li>a. Encryption</li> <li>b. Data wiping</li> <li>c. Hard drive destruction</li> <li>d. Hard drive recycling</li> <li>e. Software firewall</li> <li>f. authentication</li> </ol> </li> <li>2. Identify and describe the following:           <ol style="list-style-type: none"> <li>a. Different types of encryption technologies</li> <li>b. Security dangers posed by data wiping/hard drive destruction/hard drive recycling</li> <li>c. Port security provided by software firewall</li> <li>d. Security exceptions by software firewall</li> <li>e. Features and functions of the following authentication technologies:               <ol style="list-style-type: none"> <li>i. User name</li> <li>ii. Password</li> <li>iii. Biometrics</li> <li>iv. Smart cards</li> </ol> </li> <li>f. Importance of the following data sensitivity and data security issues:               <ol style="list-style-type: none"> <li>i. Compliance</li> <li>ii. Classification</li> <li>iii. Social engineering</li> </ol> </li> </ol> </li> <li>3. Identify and describe the following security features:           <ol style="list-style-type: none"> <li>a. Wireless encryption               <ol style="list-style-type: none"> <li>i. WEPx and WPAX</li> <li>ii. Client configuration (SSID)</li> </ol> </li> </ol> </li> </ol>	<p><b>Career Ready Practice:</b> 1, 3, 5, 10</p> <p><b>CTE Anchor:</b> Technical Knowledge and Skills: 10.1, 10.5, 10.8</p> <p><b>CTE Pathway:</b> B1.4, B8.1, B8.4</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(20 Hours)	<ul style="list-style-type: none"> <li>b. Malicious software protection               <ul style="list-style-type: none"> <li>i. Viruses</li> <li>ii. Trojans</li> <li>iii. Worms</li> <li>iv. Spam</li> <li>v. Spyware</li> <li>vi. Adware</li> <li>vii. grayware</li> </ul> </li> <li>c. BIOS security               <ul style="list-style-type: none"> <li>i. Drive lock</li> <li>ii. Passwords</li> <li>iii. Intrusion detection</li> <li>iv. Trusted Platform Module (TPM)</li> </ul> </li> <li>d. Password management/password complexity</li> <li>e. Locking workstation               <ul style="list-style-type: none"> <li>i. Hardware</li> <li>ii. Operating system</li> <li>iii. Biometrics</li> <li>iv. Finger print scanner</li> </ul> </li> </ul> <p>4. Pass the written security exam with 80% or higher score.</p>	
<p>F. TROUBLESHOOTING</p> <p>Understand, apply, and evaluate the troubleshooting, repair, and maintenance techniques and their relevance to the structure and functions of a computer system.</p>	<ul style="list-style-type: none"> <li>1. Define the following:           <ul style="list-style-type: none"> <li>a. Symptoms</li> <li>b. Problem</li> <li>c. Probable cause</li> <li>d. Solution</li> <li>e. Resolution</li> <li>f. Plan of action</li> <li>g. Finding</li> <li>h. outcomes</li> </ul> </li> <li>2. Describe the importance of the following steps in formulating troubleshooting theory:           <ul style="list-style-type: none"> <li>a. Identifying the problem               <ul style="list-style-type: none"> <li>i. Querying the user regarding:                   <ul style="list-style-type: none"> <li>• Computer changes</li> <li>• Backup performed prior to changes</li> </ul> </li> </ul> </li> <li>b. Establishing a theory of probable cause               <ul style="list-style-type: none"> <li>i. Question the obvious</li> </ul> </li> <li>c. Testing the theory to determine the cause               <ul style="list-style-type: none"> <li>i. Confirm the theory</li> <li>ii. Determine the steps for resolving problem</li> <li>iii. Formulate a new theory if previous one is unconfirmed</li> </ul> </li> <li>d. Establishing a plan of action to resolve the problem</li> <li>e. Implementing the solution</li> <li>f. Verifying full system functionality and, if applicable, implementing preventive measures</li> <li>g. Documenting finding, actions and outcomes</li> </ul> </li> </ul>	<p><b>Career Ready Practice:</b> 1, 3, 5, 10, 11</p> <p><b>CTE Anchor:</b> Problem Solving and Critical Thinking: 5.3, 5.4, 5.5, 5.6, 5.9 Technical Knowledge and Skills: 10.4, 10.5, 10.12, 10.13, 10.14</p> <p><b>CTE Pathway:</b> B2.2, B2.3, B4.1, B4.5</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
	<ol style="list-style-type: none"> <li>3. Describe and demonstrate the identification and interpretation of the following symptoms and their causes:               <ol style="list-style-type: none"> <li>a. OS-related symptoms and their causes:                   <ol style="list-style-type: none"> <li>i. Bluescreen</li> <li>ii. System lock-up</li> <li>iii. Input/output device</li> <li>iv. Application install</li> <li>v. Start or load</li> <li>vi. Windows specific printing problems:                       <ul style="list-style-type: none"> <li>• Print spool stalled</li> <li>• Incorrect/incompatible driver</li> </ul> </li> </ol> </li> <li>b. Hardware-related symptoms and their causes:                   <ol style="list-style-type: none"> <li>i. Excessive heat</li> <li>ii. Noise</li> <li>iii. Odors</li> <li>iv. Status light indicators</li> <li>v. Visible damage on:                       <ul style="list-style-type: none"> <li>• Cable</li> <li>• plastic</li> </ul> </li> </ol> </li> <li>c. Documentation and resources                   <ol style="list-style-type: none"> <li>i. Proper interpretation of user/installation manuals</li> <li>ii. Credibility of internet/web-based information</li> <li>iii. Proper use of training materials</li> </ol> </li> </ol> </li> <li>4. Describe and demonstrate the troubleshooting techniques and tools needed for the following printing problem:               <ol style="list-style-type: none"> <li>a. Managing numerous print jobs</li> <li>b. Inoperative print spooler</li> <li>c. Inappropriate printer properties and settings</li> <li>d. Difficulty in printing a test page</li> </ol> </li> <li>5. Identify and describe the potential laptop problems/issues from the following:               <ol style="list-style-type: none"> <li>a. Power conditions</li> <li>b. Video</li> <li>c. Keyboard</li> <li>d. Pointer</li> <li>e. Stylus</li> <li>f. Wireless card</li> </ol> </li> <li>6. Describe and demonstrate the following troubleshooting techniques for common laptop problems/issues:               <ol style="list-style-type: none"> <li>a. Verifying power:                   <ol style="list-style-type: none"> <li>i. From LEDs</li> <li>ii. By swapping AC adapter</li> </ol> </li> <li>b. Removing unneeded peripherals</li> <li>c. Plugging in external monitor</li> <li>d. Toggling Fn Keys or hardware switches</li> <li>e. Checking LCD cutoff switch</li> <li>f. Verifying backlight functionality and pixilation</li> <li>g. Checking switch for built-in WIFI antennas or external antennas</li> </ol> </li> </ol>	

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(95 Hours)	<ol style="list-style-type: none"> <li>7. Describe and demonstrate the integration of the following common preventive maintenance techniques:               <ol style="list-style-type: none"> <li>a. Performing regular physical inspection</li> <li>b. Responding to the following update alerts in a timely fashion:                   <ol style="list-style-type: none"> <li>i. Driver</li> <li>ii. Firmware</li> <li>iii. OS</li> <li>iv. Security</li> </ol> </li> <li>c. Scheduling preventive maintenance by:                   <ol style="list-style-type: none"> <li>i. Defragging</li> <li>ii. Running a scandisk utility</li> <li>iii. Running a check dick utility</li> <li>iv. Running startup programs</li> </ol> </li> <li>d. Appropriately using the following repair tools and cleaning materials:                   <ol style="list-style-type: none"> <li>i. Compressed air</li> <li>ii. Lint free cloth</li> <li>iii. Computer vacuum and compressors</li> </ol> </li> <li>e. Determining when to incorporate the following power devices for the computer system:                   <ol style="list-style-type: none"> <li>i. Power strip</li> <li>ii. Surge protector</li> <li>iii. UPS</li> </ol> </li> <li>f. Ensuring proper environment</li> <li>g. Performing backup procedures on a regular basis</li> </ol> </li> <li>8. Pass the written Troubleshooting exam with 80% or higher score.</li> </ol>	
<p>G. ENTREPRENEURIAL SKILLS</p> <p>Understand, apply and evaluate the process involved in becoming and entrepreneur in the computer repair and maintenance field.</p>	<ol style="list-style-type: none"> <li>1. Define entrepreneurship.</li> <li>2. Identify the necessary characteristics of successful entrepreneurs</li> <li>3. Describe the contributions of entrepreneurs to the computer repair industry.</li> <li>4. Explain the purpose and components of a business plan.</li> <li>5. Examine personal goals before starting a business.</li> <li>6. Evaluate sources of monetary investment in a business opportunity.</li> <li>7. Describe various licensing requirements in the computer repair business.</li> <li>8. Develop a scenario depicting the student as the computer repair business owner</li> <li>9. Differentiate between LEED business practices and standard business practices.</li> </ol>	<p><b>Career Ready Practice:</b> 1, 2, 3, 5, 7, 8, 9, 11</p> <p><b>CTE Anchor:</b> Career Planning and Management: 3.2, 3.3, 3.4, 3.5, 3.7 Technology: 4.1, 4.5 Responsibility and Flexibility: 7.1, 7.2, 7.4, 7.5, 7.6, 7.7 Leadership and Teamwork: 9.1</p>

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(5 Hours)		Technical Knowledge and Skills: 10.3 Demonstration and Application: 11.1, 11.3, 11.4  <b>CTE Pathway:</b> B4.6, B7.1, B7.3

## ***SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES***

### **TEXTBOOKS**

Downing, Douglas, PhD., et al. Dictionary of Computer and Internet Terms. Mc-Graw-Hill Companies, Barron's Educational Series, 2009.

Meyers, Michael. CompTIA A+ Certification All-in-One Exam Guide, 7<sup>th</sup> Edition. Mc-Graw-Hill Companies, 2010.

Microsoft Press Staff. Microsoft Computer Dictionary, 5<sup>th</sup> Edition. Microsoft Press, 2002.

### **RESOURCES**

Employer Advisory Board members

CTE Foundation Standards

<http://www.cde.ca.gov/ci/ct/sf/documents/ctestandards.pdf>

<http://www.cde.ca.gov/be/st/ss/documents/ctestandards.doc>

[Computing Technology Industry Association \(CompTIA\)](#), 1815 S. Meyers Rd., Suite 300, Oakbrook Terrace, IL 60181-5228. Phone: (630) 678-8300. Fax: (630) 268-1384

### **COMPETENCY CHECKLIST**

## ***TEACHING STRATEGIES and EVALUATION***

### **METHODS AND PROCEDURES**

- A. Lecture and discussion
- B. Multimedia presentations
- C. Demonstrations and participations
- D. Individualized instruction
- E. Peer teaching
- F. Role-playing
- G. Guest speakers
- H. Field trips and field study experiences
- I. Projects

### **EVALUATION**

SECTION A – Introduction and Safety – Pass the safety test with 100% accuracy.

SECTION B – Resource Management Review – Pass all assignments and exams on resource management review with a minimum score of 80% or higher.

SECTION C – Computer Math Review – Pass all assignments and exams on computer math review with a minimum score of 80% or higher.

SECTION D – Networking – Pass all assignments and exams on networking with a minimum score of 80% or higher.

SECTION E – Security – Pass all assignments and exams on security with a minimum score of 80% or higher.

SECTION F – Troubleshooting – Pass all assignments and exams on troubleshooting with a minimum score of 80% or higher.

SECTION G – Entrepreneurial Skills – Pass all assignments and exams on entrepreneurial skills with a minimum score of 80% or higher.

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### Statement for Civil Rights

All educational and vocational opportunities are offered without regard to race, color, national origin, gender, or physical disability.

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