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

74-15-50

A+ Certification / 1

Credits: 15 **Hours:** 180

Course Description:
This competency-based course is the first 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 orientation, workplace safety policies and procedures, and employability skills. Emphasis is placed on computer mathematics and the features and functions of the hardware components of a computer system: storage devices, motherboard, power supply devices, central processing unit, display devices, peripherals and input devices, adapter cards, and printers as well as laptops. 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 one of the Computer Operation courses (75-35-80, 75-35-90, 75-45-50, 75-45-60, or 75-45-70).

NOTE: For Perkins purposes this course has been designated as an **introductory** course.

Meets CompTIA A+ Essentials Certification requirements.

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

Los Angeles Unified School District
Division of Adult and Career Education
Instructional and Couseling Services Unit
Adult Curriculum Office
www.wearedace.org

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	pp. 7-15

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	p. 17
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. 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.	pp. 7-15
EVALUATION PROCEDURES	pp. 17-18
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.

ANA MARTINEZ
Specialist
Career Technical Education

ROSARIO GALVAN
Administrator
Division of Adult and Career Education

APPROVED:

JOE STARK
Executive Director
Division of Adult and Career Education

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.

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/1 Course

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
A. ORIENTATION AND SAFETY Understand, apply, and evaluate classroom and workplace policies and procedures used in accordance with federal, state, and local safety and environmental regulations. (5 hours)	1. Describe the scope and purpose of the course. 2. Describe the overall course content as a part of the linked Learning Initiative. 3. Describe classroom policies and procedures. 4. Identify classroom and workplace first aid and emergency procedures based on the American Red Cross (ARC) standards. 5. Describe the different occupations in the Engineering and Design Industry Sector which have an impact on the role of computer technicians. 6. Describe the opportunities available for promoting gender equity and the representation of non-traditional populations in computer technology. 7. Explain the impact of Environmental Protection Agency (EPA) legislation on Engineering and Design Industry Sector practices in protecting and preserving the environment. 8. Describe and demonstrate the procedures for contacting proper authorities for the removal of hazardous materials based on the EPA standards. 9. Describe and demonstrate the use of the Material Safety Sheet (MSDS) as it applies to the computer technology industry. 10. Describe 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. 11. Describe the California Occupational Safety and Health Administration (Cal/OSHA) and its laws governing computer technicians. 12. Describe hoe each of the following insures a safe workplace: a. Employees' rights as they apply to job safety b. Employees' obligations as they apply to safety c. Safety laws applying to electrical tools d. Proper use of static straps and static mats 13. Pass the safety exam with 100% accuracy.	**Career Ready Practice:** 1, 3, 6, 7, 12 **CTE Anchor:** 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 Responsibility and Flexibility: 7.3, 7.7, 7.8 Ethics and Legal Responsibilities: 8.2 Leadership and Teamwork: 9.5, 9.6 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.1 **CTE Pathway:** B1.1, B4.7

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
B. RESOURCE MANAGEMENT Understand, apply, and evaluate the resource management principles and techniques in the computer repair and maintenance field. (2 hours)	1. Define the following: a. Resources b. Management c. sustainability 2. Describe the management of the following resource in computer repair and maintenance: a. Time b. Materials c. personnel 3. List specific example of effective management of the following in computer repair and maintenance: a. Time b. Materials c. Personnel 4. Describe the benefit of effective resource management in computer repair and maintenance: a. Profitability b. Sustainability c. Company growth 5. Describe the economic benefit and liabilities of managing resources in an environmentally responsible way.	**Career Ready Practice:** 1, 2, 3, 7, 8, 9, 12 **CTE Anchor:** 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 **CTE Pathway:** B4.1, B4.2, B4.6, B4.8, B6.2, B7.1, B8.2
C. COMPUTER MATH Understand, apply and evaluate the powers of then, metric prefixes and the binary and hexadecimal number systems.	1. Identify the practical applications of math in engineering design. 2. Describe the powers of ten and decimal number system. 3. Describe the metric prefixes (engineering prefixes) associated with computers. 4. Describe the binary number system. 5. Describe and demonstrate the conversion of decimal numbers to binary numbers. 6. Describe and demonstrate the conversion of binary numbers to decimal numbers. 7. Describe the hexadecimal number system. 8. Describe and demonstrate the conversion of decimal numbers to hexadecimal numbers. 9. Describe and demonstrate the conversion of hexadecimal number to decimal number. 10. Describe and demonstrate the conversion of hexadecimal numbers to binary numbers.	**Career Ready Practice:** 1, 3, 4, 5 **CTE Anchor:** 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

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(10 hours)	11. Describe and demonstrate the conversion of binary numbers to hexadecimal numbers. 12. Describe the American Standard Code for Information Interchange (ASCII) Code 13. Pass the written Computer Math exam with 80% or higher score.	Demonstration and Application: 11.1 **CTE Pathway:** B1.1
D. HARDWARE: STORAGE DEVICES Understand, apply, and evaluate the principles and techniques used for the installation operation, and performance testing of the storage devices of a computer system. (15 hours)	1. Identify, categorize, and describe the features and functions of the following storage devices and backup media: a. Floppy Disc Drive (FDD) b. Hard Disc Drive (HDD) i. Solid state (SSD) ii. magnetic c. Optical disc drives (ODD) i. Compact Disc (CD) ii. Digital Versatile Disc (DVD) iii. Rewriteable (RW) iv. Blu-ray Disc (BD) d. Removable storage i. Tape drive ii. Solid state • Thumb drive • Flash memory • SD cards • Universal Serial Bus (USB) Mass Storage Device (MSC/UMS) iii. External CD-RW and hard drive iv. Hot and non-hot swappable devices 2. Describe and demonstrate the installation, operation and performance testing of the various types of storage devices and backup media. 3. Pass the written Storage Devices exam with 80% or higher score.	**Career Ready Practice:** 1, 3, 4, 5 **CTE Anchor:** Technology: 4.1, 4.3 Problem Solving and Critical Thinking: 5.1, 5.4, 5.5, 5.6 Health and Safety: 6.1 Technical Knowledge and Skills: 10.1, 10.3, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B2.3, B3.4, B3.6, B4.4, B4.8, B5.2, B6.3, B7.2, B7.3, B7.4, B8.4, B8.5
E. HARDWARE: MOTHERBOARD Understand, apply, and evaluate the principles and techniques used for the installation, operation, and performance testing of the motherboard of a computer system.	1. Identify and describe the features and fractions of the following motherboard components: a. Form factor i. Advanced Technology Extended/Balanced Technology Extended(ATX/BTX) ii. Micro ATX iii. New Low Profile Extended (NLX) b. Input/Output (I/O) interfaces i. Sound ii. Video iii. Universal Serial Bus (USB) 1.1 and 2.0 iv. Serial	**Career Ready Practice:** 1, 3, 4, 5 **CTE Anchor:** Technology: 4.1 Problem Solving and Critical Thinking: 5.6

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(25 hours)	v. International Electrical and Electronic Engineer (IEEE) 1394 / firewire / Ilink /Lynx vi. Parallel vii. Network interface Controller (NIC) viii. Modem ix. PS/2 c. Memory slots i. RIMM ii. Dual In-line Memory Module (DIMM) iii. Small Outline Dual In-line Memory Module (SODIMM) iv. Single In-line Memory Module (SODIMM) d. Processor sockets e. Bus architecture f. Bus slots i. Peripheral component Interconnect (PCI) ii. Accelerated Graphics Port (AGP) iii. Peripheral Component Interconnect Express (PCIe) iv. Audio Modem Riser (AMR) v. Communications and Network Riser (CNR) vi. Personal Computer Memory Card International Association (PCMCIA) g. Parallel Advanced technology Attachment (PATA) i. Intelligent/Integrated Drive Electronics (IDE) ii. Enhanced IDE (EIDE) h. Serial ATA (SATA), External ATA (eSATA) i. Contrast Redundant Array of Inexpensive/Independent Disk (RAID) i. Level 0 ii. Level 1 iii. Level 2 j. Chipsets k. Basic Input/output System (BIOS)/CMOS/Firmware i. Power-on Self-Test (POST) ii. CMOS battery l. Riser card/daughterboard 2. Describe and demonstrate the installation, operation, and performance testing of the motherboard components. 3. Pass the written motherboard exam.	Technical Knowledge and Skills: 10.1, 10.5, 10.6, 10.7, 10.9, 10.10, 10.11 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B1.1, B1.2, B1.5, B1.6, B2.3, B3.1, B3.2
F. HARDWARE: POWER SUPPLY Understand, apply, and evaluate the law of electromagnetism and Ohm's law and their relevance to the structure and function of a computer system.	1. Define the following: a. Electricity b. Static electricity c. Direct current (DC) d. Alternating current (AC) e. Power 2. Describe the following laws: a. Repulsion and attraction of like/unlike charges/poles b. Ohm's law c. Series circuits	**Career Ready Practice:** 1, 3, 5 **CTE Anchor:** Problem Solving and Critical Thinking: 5.6

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(20 hours)	d. Parallel circuits e. Combination circuits 3. Describe and demonstrate basic soldering techniques. 4. Describe and demonstrate the use of a digital multimeter. 5. Describe the features and functions of power conditioners and uninterruptible power supplies. 6. Describe the role of various power supplies in preventing loss of date and damage to hardware sags and surges. 7. Identify, classify, and ddescribe the features and functions of the following power supply types: a. AC adapter b. ATX proprietary c. Voltage, wattage, and capacity d. Voltage selector switch e. Pins (20, 24) 8. Describe the features and functions of surge suppressors and power strips. 9. Describe and demonstrate the measurement of voltages on the following: a. Power supply b. Motherboard c. Storage device 10. Describe the techniques in preventive maintenance and Electrical Static Discharge (ESD). 11. Pass the written power Supply exam with 80% or higher score	Technical Knowledge and Skills: 10.1, 10.7 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B2.3, B5.1, B5.2
G. HARDWARE: CENTRAL PROCESSING UNIT (CPU) Understand, apply and evaluate the principles and techniques used for the installation, operation, and performance testing of the CPU of a computer system.	1. Identify and describe the features and functions of the following types of CPUs: a. Advanced Micro Devices (AMD) b. Intel 2. Describe the following characteristics of CPUs: a. Hyper threading b. Multi core i. Dual core ii. Triple core iii. Quad core c. Onchip cache i. Level 1 (L1) ii. L2 d. Speed e. 32 bit vs. 64 bit 3. Identify and describe the following cooling devices and/or methods: a. Heat sinks b. CPU and case fans c. Liquid cooling systems d. Thermal compound	**Career Ready Practice:** 1, 3, 4, 5, 11 **CTE Anchor:** Problem Solving and Critical Thinking: 5.6 Technical Knowledge and Skills: 10.1, 10.5, 10.6, 10.7, 10.9, 10.10, 10.11 **CTE Pathway:** B1.1, B7.3

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(20 hours)	4. Identify and describe the features and functions of the following types of memory: a. Dynamic Random Access Memory (DRAM) b. Static Random Access Memory (SRAM) c. Synchronous Dynamic Random Access Memory (SDRAM) double Date Rate (DDR/DDR2/DDR3) d. RambusDRAM (RDRAM)	
H. HARDWARE: DISPLAY DEVICES Understand and evaluate the principles and techniques used for the installation, operation, and performance testing of the display devices of a computer system. (15 hours)	1. Identify and describe the features and functions of the following display devices: a. Digital Light Processing (DLP) projectors b. Cathode Ray Tube (CRT) c. Liquid Crystal Display (LCD) d. Light Emitting Diode (LED) 2. Describe the following characteristics of LCD technologies: a. Resolution i. Extended Graphics Array (XGA) ii. Super Extended Graphics Array (SXGA) iii. Ultra Extended Graphics Array b. Widescreen Ultra Extended Graphics Array (WUXGA) Contrast ratio c. Native resolution 3. Identify and describe the functions of the following connector types for display devices: a. Video Graphic Array (VGA) b. High-Definition Multimedia interface (HDMI) c. Super-video (S-Video) d. Component / RGB e. Digital Video Interface (DVI) pin compatibility 4. State the following setting for display devices: a. Refresh rate b. Image resolution c. Multi-monitor d. degauss 5. Describe and demonstrate the installation, operation and performance testing of various types of display devices and their respective connectors. 6. Pass the written Display Devices exam with 80% or higher score.	**Career Ready Practice:** 1, 3, 4, 5 **CTE Anchor:** Technology: 4.1 Health and Safety: 6.11 Technical Knowledge and Skills: 10.1 Demonstration and Application: 11.2 **CTE Pathway:** B4.7
I. HARDWARE: PERIPHERAL AND INPUT DEVICES Understand, apply, and evaluate the principle and techniques used for the installation, operation, and performance testing of the peripherals and	1. Identify and describe the features and functions of the following peripherals and input devices: a. Mouse b. Keyboard c. Bar code reader d. Multimedia i. Web camera ii. Digital; camera iii. Musical instrument Digital Interface (MIDI) iv. Microphone	**Career Ready Practice:** 1, 3, 4, 5, 10 **CTE Anchor:** Communications: 2.1, 2.2, 2.5, Technology: 4.1 Problem Solving and

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
input devices of a computer system. (15 hours)	e. Biometric devices f. Touch screen g. Keyboard, video or visual Display Unit, Mouse (KVM) switch 2. Describe and demonstrate the installations and configuration of the various types of peripheral and input devices. 3. Pass the written peripheral and input devices exam with 805 or higher score	Critical Thinking: 5.6 Technical Knowledge and Skills: 10.1, 10.3, 10.11 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B1.3, B7.4
J. HARDWARE: ADAPTER CARDS Understand, apply, and evaluate the principles and techniques used for the installation, operation, and performance of the adapter cards of a computer system. (10 hours)	1. Identify and describe the features and functions of the following types of adapter card: a. Video i. PCI ii. PCIe iii. AGP b. Multimedia i. Sound card ii. TV tuner cars iii. Capture c. I/O i. Small Computer System Interface (SCSI) ii. Serial iii. USB iv. Parallel d. Communications i. NIC ii. modem 2. Describe and demonstrate the installation, operation, and performance testing of the various types of adapter cards. 3. Pass the written Adapter Cards exam with 80% or higher score.	**Career Ready Practice:** 1, 3, 4, 5, 10 **CTE Anchor:** Technology: 4.1, 4.2 Problem Solving and Critical Thinking: 5.6 Technical Knowledge and Skills: 10.1, 10.3, 10.5, 10.7, 10.11 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B1.1, B1.3, B2.1, B3.1, B3.1, B3.4, B6.1
K. HARDWARE: LAPTOP Understand, apply, and evaluate the principles and techniques used for the installation, operation, performance testing of the laptop components of a computer system.	1. Identify and describe the features and functions of the following expansion devices: a. PCMCIA cards b. PC express cards c. Docking station 2. Identify and describe the features and functions of the following communication connections: a. Bluetooth b. Infrared c. Cellular WAN d. Ethernet	**Career Ready Practice:** 1, 3, 4, 5, 10 **CTE Anchor:** Communications: 2.1, 2.5 Technology: 4.2, 4.3

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(20 hours)	e. Modem 3. Identify and discuss the features and functions of the following power and electrical input devices: a. Auto-switching devices b. Fixed input power supply devices 4. Describe and demonstrate the installation, configuration, and optimization of the various types of expansion devices with their respective communication connections and power and electrical input devices. 5. Pass the written laptop exam with 80% or higher score.	Problem Solving and Critical Thinking: 5.1, 5.6 Technical Knowledge and Skills: 10.1, 10.3, 10.5, 10.6, 10.7, 10.8, 10.10, 10.11 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B1.1, B1.3, B1.5, B2.2, B2.3, B3.1, B3.5, B3.6, B4.1, B4.5, B6.3, B8.1, B8.4, B8.5
L. HARDWARE: PRINTERS Understand, apply, and evaluate the principles and techniques used for the installation, operation, performance testing of the printing device of a computer system. (15 hours)	1. Identify and describe the features and functions of the following types of printers: a. Laser b. Inkjet c. Thermal d. Impact 2. Explain the differences between local and network printers. 3. Describe the compatibility of printer drivers. 4. Define consumables 5. Describe and demonstrate the installation and configuration of the various types of printers. 6. Pass the written printers exam with 80% or higher score.	**Career Ready Practice:** 1, 3, 4 **CTE Anchor:** Technical Knowledge and Skills: 10.1, 10.3 Demonstration and Application: 11.1, 11.2 **CTE Pathway:** B2.1, B2.3, B3.4 B3.6, B4.1, B6.1
M. EMPLOYABILITY SKILLS Understand, apply, and evaluate the employability skills required in the A+Certification field.	1. Summarize employers requirements for the following: 2. Identify potential employers through traditional and internet sources. 3. Describe the role of social media in job search. 4. Design sample résumés and covers letters. 5. Explain the importance of filling out a job application legibly, with accurate and complete information. 6. Describe the common mistakes that are made on job applications. 7. Complete sample job application forms correctly. 8. State the importance of enthusiasm in the interview and on a job.	**Career Ready Practice:** 1, 2, 3, 4, 6, 7, 8, 9, 11, 12 **CTE Anchor:** Communications: 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8,

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
(8 hours)	9. State the importance of appropriate appearance in the interview and on a job. 10. State the importance of the continuous upgrading of job skills. 11. Describe customer service as a method of building permanent relationships between the organization and the customer. 12. Describe and Demonstrate appropriate interviewing techniques. 13. Identify the informational materials and resources needed to be successful in an interview. 14. Design sample follow-up letters. 15. Describe and demonstrate appropriate follow-up procedures.	Career Planning and Management: 3.1, 3.2, 3.3, 3.4, 3.8 Technology: 4.5 **CTE Pathway:** 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, 7th Edition. Mc-Graw-Hill Companies, 2010.

Microsoft Press Staff. Microsoft Computer Dictionary, 5th 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 – Orientation and Safety – Pass the safety test with 100% accuracy.

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

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

SECTION D – Hardware: Storage Devices – Pass all assignments and exams on hardware: storage devices with a minimum score of 80% or higher.

SECTION E – Hardware: Motherboard – Pass all assignments and exams on hardware: motherboard with a minimum score of 80% or higher.

SECTION F – Hardware: Power Supply – Pass all assignments and exams on hardware: power supply with a minimum score of 80% or higher.

SECTION G – Hardware: Central Processing Unit (CPU) – Pass all assignments and exams on hardware: central processing unit (CPU) with a minimum score of 80% or higher.

SECTION H – Hardware: Display Devices – Pass all assignments and exams on hardware: display devices with a minimum score of 80% or higher.

SECTION I – Hardware: Peripherals and Input Devices – Pass all assignments and exams on hardware: peripherals and input devices with a minimum score of 80% or higher.

SECTION J – Hardware: Adapter Cards – Pass all assignments and exams on hardware: laptop with a minimum score of 80% or higher

SECTION K – Hardware: Laptop – Pass all assignments and exams on hardware: adapter cards with a minimum score of 80% or higher

SECTION L – Hardware: Printers – Pass all assignments and exams on hardware: printers with a minimum score of 80% or higher

SECTION M – Employability Skills – Pass all assignments and exams on employability skills with a minimum score of 80% or higher.

Statement for Civil Rights

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