

Career Technical Education (CTE) Course Outline

Course Title:	Associate IT Electronics Communication Technician
Course Number:	79-30-67
Date:	June 2024
Industry Sector:	Information and Communication Technologies
Pathway:	Information Support and Services
CBEDS Title:	Office Systems and Technologies
CBEDS Code:	4615
Credits:	10

Hours:

Total
120

Course Description:

This competency-based course prepares students for entry-level positions as Information Technology Electronics Communication Technicians. Instruction includes introduction, safety, tools and equipment, basic electrical theories, telephone and wired systems, public address systems introduction, intrusion alarm system introduction, camera systems introduction, networking introduction, basic low voltage and network cabling practices, troubleshooting skills, employability skills and resume preparation. 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 a 9.0 reading level as measured by the CASAS GOALS Test.
NOTE:	For Perkins purposes this course has been designated as an introductory course. This course cannot be repeated once a student receives a Certificate of Completion.
A-G Approval	N/A
Methods of Instruction:	Lectures and discussion, demonstrations, student hands-on practice, individualized instruction, critical thinking and listening skills, and peer teaching and cooperative learning
Student Evaluation:	Summative: End of section assessments
Industry Certification:	N/A
Recommended Texts:	<p>Sclater, Neil, Traister, John E. <u>The Handbook of Electrical Design Details, 2nd Edition</u>, Mc-Graw Hill Professional, 2003</p> <p>SUPPLEMENTAL TEXTBOOKS</p> <p>Severance, Charles R. <u>Introduction to Networking: How the Internet Works</u>, CreateSpace Independent Publishing Platform, 2015</p> <p>Fogiel, M. U.S. Naval Personnel, <u>Basic Electricity</u>, The Editors of Research & Education Association, 2002</p>
Link to Resource Folder	https://bit.ly/associateitectresources

Approved by: Renny L. Neyra, Executive Director

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES	STANDARDS
<p>A. INTRODUCTION</p> <p>Identify skills required, equipment and materials used, classroom procedures, and available job opportunities.</p>	<ol style="list-style-type: none"> 1. Describe the scope and purpose of the course. 2. Describe classroom policies and procedures. 3. Describe the importance of prioritizing work, practicing time management and efficiency to fulfill responsibilities. 4. Explain the importance of customer-oriented service approach. 5. Discuss, identify, research, and compare the different career paths, occupations, employment outlook, career advancements, and its impact on the Information and Communication Technologies Industry Sector to make informed decisions. 6. Explain the proper use and installation of cameras, digital media, expectations of privacy. 7. Describe the opportunities available for promoting gender equity and the representation of non-traditional populations. 8. Explain and recognize the importance of ethical behavior, adaptability, responsibility, teamwork, respecting individual and cultural differences and diversity in the workplace. 9. Discuss and demonstrate the qualities and behaviors that constitute a positive and professional work demeanor, including appropriate attire for the profession. 10. Describe the duties and job roles as they apply to the Information and Communication Technologies Industry Sector. 	<p>Career Ready Practice: 1, 2, 3, 4, 5, 7, 8, 9, 10, 11</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.2, 2.3, 2.5, 2.6, 2.8 Career Planning & Management: 3.2, 3.3., 3.4, 3.5, 3.9 Technology: 4.2, 4.3, 4.5 Problem Solving & Critical Thinking: 5.3, 5.4 Responsibility & Flexibility: 7.2, 7.3, 7.4, 7.7 Ethics & Legal Responsibilities: 8.1, 8.4, 8.5 Leadership & Teamwork: 9.3, 9.6, 9.7 Technical Knowledge & Skills: 10.12 Demonstration & Application:</p>

(2 hours)		11.1 CTE Pathway: B7.1
<p>B. SAFETY</p> <p>Review, understand, apply, and demonstrate the principles of safety and ergonomics.</p>	<ol style="list-style-type: none"> 1. Explain and define the impact of Environmental Protection Agency (EPA) legislation on Information and Communication Technologies Industry Sector practices in protecting and preserving the environment. 2. Describe and demonstrate the procedures for contacting proper authorities for the removal of hazardous materials based on the EPA standards. 3. Explain the proper disposal of e-waste properly, understanding the health, environmental, and legal risks of improper disposal. 4. Describe, demonstrate, define, and research the use of the Safety Data Sheet (SDS) to include asbestos as it applies to the Information and Communication Technologies Industry Sector to make informed decisions for hazardous materials. 5. Describe and define the California Occupational Safety and Health Administration (Cal/OSHA) and its laws governing Information and Communication Technologies Industry Sector. 6. Describe how each of the following insures a safe workplace: <ol style="list-style-type: none"> a. employees' rights as they apply to job safety b. employees' obligations as they apply to safety c. safety laws applying to electrical tools 7. Define ergonomics and demonstrate sound ergonomic practices such as: <ol style="list-style-type: none"> a. identify causes, effects, and preventive measures for repetitive strain injuries b. while seated, stretch your hands, fingers, and arms from time to time c. shift your position, standing up and moving will ease strain on your body and help you stay healthier d. organize and sanitize one's workspace 	<p>Career Ready Practice: 1, 2, 4, 5, 8, 10, 11, 12</p> <p>CTE Anchor:</p> <p>Academics: 1.0</p> <p>Communications: 2.1, 2.2, 2.5</p> <p>Technology: 4.3, 4.5</p> <p>Problem Solving & Critical Thinking: 5.4</p> <p>Health & Safety: 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9</p> <p>Ethics & Legal Responsibilities: 8.2</p> <p>Technical Knowledge & Skills: 10.1, 10.2</p> <p>Demonstration & Application: 11.1</p> <p>CTE Pathway: B6.1</p>

(4 hours)	<ul style="list-style-type: none"> e. maintain a safe and healthful working environment 8. Practice personal safety when lifting, bending, moving, utilizing equipment and supplies. 9. Pass the safety test with 100% accuracy. 	
<p>C. TOOLS AND EQUIPMENT</p> <p>Understand, apply, and evaluate the techniques for using, maintaining, and storing standard electronic tools and equipment.</p>	<ul style="list-style-type: none"> 1. Describe demonstrate, and define the proper use, maintenance, and storage techniques for the following basic hand electronic tools and equipment: <ul style="list-style-type: none"> a. long nose pliers, 3" b. diagonal cutting pliers, 3" c. flat nose cutting pliers, 3" (nippers) d. miniature jeweler screwdrivers (flat blade and Phillips) e. TORX[®] Drivers f. screwdrivers, flat blade, 4" (1/8, 3/16, 1/4, and 5/16) g. screwdrivers, Phillips head 4" (#1, #2, and #3) h. wire strippers i. adjustable wire strippers j. needle nose pliers, 3"nut driver set (1/8 - 3/4) k. heat sink l. flashlight m. telescoping magnet 2. Describe and demonstrate the proper use, maintenance, and storage techniques used for the following electronic testing instruments: <ul style="list-style-type: none"> a. a digital multimeter b. a signal generator 3. Describe and demonstrate the proper use, maintenance, and storage techniques for the following networking tools and equipment: <ul style="list-style-type: none"> a. visual finder b. DSX tester c. punch down tools d. CAT 5, CAT6, and related hardware e. fiber optic cables and related hardware 4. Describe the Ohmmeter's function, range, and method of use. 5. Describe voltmeter function, range, and method of use. 	<p>Career Ready Practice: 1, 2, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.3, 2.5 Problem Solving & Critical Thinking: 5.3 Leadership & Teamwork 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1</p>

(6 hours)	<ol style="list-style-type: none"> 6. Describe and demonstrate the following: <ol style="list-style-type: none"> a. checking voltage using various ranges b. measuring ten unknown voltages with a voltmeter 7. Form teams to collaborate identifying the various tools and equipment. 8. Pass a tools and equipment assessment with an 80% score or higher. 	
<p>D. BASIC ELECTRICAL THEORIES</p> <p>Understand the fundamentals of electricity as it is used in the electronics communication technician field.</p>	<ol style="list-style-type: none"> 1. Define, describe, and demonstrate and the following: <ol style="list-style-type: none"> a. conductors b. insulators c. electricity d. energy e. work f. magnetism g. magnetic polarity h. semiconductors i. direct current (DC) j. alternating current (AC) k. voltage l. power (a.k.a. watts) m. resistance (a.k.a. ohms) n. current (a.k.a. amperage) o. Watts Law p. Ohms Law q. simple circuit r. series circuits s. parallel circuits t. complex circuits 2. Describe the operation of a simple battery or cell. 3. Form teams to describe and demonstration the following: <ol style="list-style-type: none"> a. calculation of the values of a simple light circuit using Watts Law b. proper use of a multimeter 4. Explain power conditioners and uninterruptible power supplies. 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3 Leadership & Teamwork 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1.</p>

(10 hours)	<ol style="list-style-type: none"> 5. Describe the use of various power supplies for preventing loss of data and damage to hardware from sags and surges. 6. Pass a basic electrical theories assessment with an 80% score or higher. 	
<p>E. TELEPHONE AND WIRED SYSTEMS</p> <p>Understand, apply, and evaluate the basic principles and uses of telephone and wired systems.</p> <p>(20 hours)</p>	<ol style="list-style-type: none"> 1. Define and demonstrate the following: <ol style="list-style-type: none"> a. signal/reception b. single zone c. dead zone d. twisted pair 2. Identify various signals and messages used to operate local telephone services. 3. Describe the advantages and disadvantages of each LAN transmission media. 4. Identify the transmission distance of each cabling technique. 5. Form teams to describe and demonstrate the following: <ol style="list-style-type: none"> a. wiring an extension phone b. testing a phone circuit c. connecting LANs d. troubleshooting cabling problems e. increasing cabling distance f. cable color codes g. buttset to identify telephone lines 6. Explain and demonstrate proper termination of cabling. 7. Pass a telephone and wired systems assessment with an 80% score or higher. 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3 Leadership & Teamwork 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1</p>
<p>F. PUBLIC ADDRESS SYSTEMS INTRODUCTION</p> <p>Understand, apply, and evaluate the basic</p>	<ol style="list-style-type: none"> 1. Define and explain the different types of public address systems. 2. Identify the various parts of a public address system: <ol style="list-style-type: none"> a. speakers b. microphones c. amps 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics:</p>

<p>principles and uses of public address systems.</p> <p>(8 hours)</p>	<ul style="list-style-type: none"> d. mixer e. gateways <ol style="list-style-type: none"> 3. Demonstrate and form teams on how to wire an amp, speaker, and microphone. 4. Pass a public address system assessment with an 80% score or higher. 	<p>1.0</p> <p>Communications: 2.1, 2.3, 2.5</p> <p>Technology: 4.2</p> <p>Problem Solving & Critical Thinking: 5.3</p> <p>Leadership & Teamwork 9.3, 9.7</p> <p>Technical Knowledge & Skills: 10.1</p> <p>Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1.</p>
<p>G. INTRUSION ALARM SYSTEM INTRODUCTION</p> <p>Understand, apply, and evaluate the basic principles and uses of an intrusion alarm system.</p>	<ol style="list-style-type: none"> 1. Define and explain an intrusion alarm system. 2. Identify the various parts of an intrusion alarm system: <ul style="list-style-type: none"> a. keypads b. sensors c. enclosures d. panels 3. Form teams to demonstrate basic wiring of an intrusion alarm system. 4. Pass an intrusion alarm system assessment with an 80% score or higher. 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0</p> <p>Communications: 2.1, 2.3, 2.5</p> <p>Technology: 4.2</p> <p>Problem Solving & Critical Thinking: 5.3</p> <p>Leadership & Teamwork 9.3, 9.7</p>

(8 hours)		<p>Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1</p>
<p>H. CAMERA SYSTEMS INTRODUCTION</p> <p>Understand, apply, and evaluate the basic principles and uses of a camera system.</p>	<ol style="list-style-type: none"> 1. Define and explain a camera system. 2. Identify the various parts of a camera system: <ol style="list-style-type: none"> a. cameras b. DVR/NVR recording equipment c. servers d. viewing station 3. Form teams to demonstrate how to install a camera system. 4. Pass a camera systems assessment with an 80% score or higher. 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.3 Leadership & Teamwork 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1</p>
(8 hours)		

<p>I. NETWORKING INTRODUCTION</p> <p>Understand basic networking features.</p> <p>(20 hours)</p>	<ol style="list-style-type: none"> 1. Define and demonstrate the following network terminology: <ol style="list-style-type: none"> a. internet b. intranet c. browser d. ISP e. IP address f. URL g. LAN h. WLAN i. VOIP 2. Define, demonstrate, and form teams to identify and explain the following network infrastructure terminology: <ol style="list-style-type: none"> a. cable types b. topologies c. connectors d. color codes e. drawings overview 3. Proper pulling techniques (do not pull fiber the same as copper) & tie offs, glow rods, fish tapes and rodders. 4. Configure TCP/IP in Windows. 5. Demonstrate connecting to the Internet. 6. Describe cable modem. 7. Describe a SOHO (Small Office Home Office) router. 8. Explain public and private IP addresses. 9. Explain default gateway. 10. Explain DNS (Domain Name System) 11. Explain wireless and wired networks. 12. Pass a networking assessment with an 80% score or higher. 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics: 1.0 Communications: 2.1, 2.3, 2.5 Technology: 4.2 Problem Solving & Critical Thinking: 5.1, 5.2, 5.3 Leadership & Teamwork 9.3, 9.7 Technical Knowledge & Skills: 10.1 Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1, B1.2, B1.3, B1.5, B2.1, B3.1, B3.3, B4.1</p>
<p>J. BASIC LOW VOLTAGE AND NETWORK CABLING PRACTICES</p> <p>Understand, apply, and evaluate the basic low</p>	<ol style="list-style-type: none"> 1. Define and demonstrate the following terms: <ol style="list-style-type: none"> a. OSP CAT cable b. plenum vs. riser c. stranded vs. solid conductor d. tight buffer vs. loose tube fiber e. CAT5 cable 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor: Academics:</p>

<p>voltage and network cabling practices.</p> <p>(20 hours)</p>	<ol style="list-style-type: none"> f. CAT6 cable g. coax cable h. twenty-five pair cable i. hybrid fiber cables j. single mode vs. multi-mode fiber k. cable gauges l. cable termination blocks <ol style="list-style-type: none"> 2. Explain and demonstrate the proper use for each cable. 3. Form teams to demonstrate how to terminate each cable. 4. Pass a basic low voltage and network cabling practices assessment with an 80% score or higher. 	<p>1.0</p> <p>Communications: 2.1, 2.3, 2.5</p> <p>Technology: 4.2</p> <p>Problem Solving & Critical Thinking: 5.3</p> <p>Leadership & Teamwork 9.3, 9.7</p> <p>Technical Knowledge & Skills: 10.1</p> <p>Demonstration & Application: 11.1</p> <p>CTE Pathway: B1.1, B3.1</p>
<p>K. TROUBLESHOOTING SKILLS</p> <p>Understand the importance of researching and gathering user information for diagnostic and troubleshooting.</p>	<ol style="list-style-type: none"> 1. Explain how to approach the problem logically. 2. Describe the importance of research. 3. Describe the importance of talking to the user. 4. Describe how to talk to the user to acquire information. 5. Role-play listening to a user, providing feedback, and diagnosis. 6. Define intermittent problems. 7. Explain the importance of problem isolation. 8. Define the steps of problem determination. 9. Define the steps of problem verification. 10. Form teams to demonstrate the ability to troubleshoot by successfully diagnosing system problems and resolving them: <ol style="list-style-type: none"> a. telephone and wired systems b. public address systems c. intrusion alarm system d. camera systems 	<p>Career Ready Practice: 1, 2, 4, 5, 9, 10</p> <p>CTE Anchor:</p> <p>Academics: 1.0</p> <p>Communications: 2.1, 2.3, 2.5</p> <p>Technology: 4.2</p> <p>Problem Solving & Critical Thinking: 5.1, 5.2, 5.3, 5.4, 5.5</p> <p>Leadership & Teamwork 9.3, 9.7</p>

<p>(10 hours)</p>	<p>e. network systems</p> <p>11. Pass a troubleshooting skills assessment with an 80% score or higher.</p>	<p>Technical Knowledge & Skills:</p> <p>10.1 Demonstration & Application:</p> <p>11.1</p> <p>CTE Pathway:</p> <p>B1.1</p>
<p>L. EMPLOYABILITY SKILLS AND RESUME PREPARATION</p> <p>Understand, apply, and evaluate employability and resume preparation skills.</p>	<ol style="list-style-type: none"> 1. Understand and define employer requirements for soft skills such as: <ol style="list-style-type: none"> a. attitude toward work b. communication and collaboration c. critical thinking, problem solving, and decision-making d. customer service e. diversity in the workplace f. flexibility and adaptability g. interpersonal skills h. leadership and responsibility i. punctuality and attendance j. quality of work k. respect, cultural and diversity differences l. teamwork m. time management n. trust and ethical behavior o. work ethic 2. Develop a career plan that reflects career interests, pathways, and post-secondary options. 3. Create/revise a resume, cover letter and/or portfolio. 4. Demonstrate, analyze, research, and review the role of online job searching platforms and career websites to make informed decisions. 5. Understand the importance of assessing social media account content for professionalism. 6. Demonstrate and complete and/or review an on-line job application. 	<p>Career Ready Practice:</p> <p>1, 2, 3, 4, 5, 7, 8, 9, 10, 11</p> <p>CTE Anchor:</p> <p>Academics:</p> <p>1.0</p> <p>Communications:</p> <p>2.1, 2.2, 2.3, 2.4, 2.5</p> <p>Career Planning & Management:</p> <p>3.2, 3.2, 3.3, 3.4, 3.6, 3.8</p> <p>Technology:</p> <p>4.1, 4.2, 4.3</p> <p>Problem Solving & Critical Thinking:</p> <p>5.1, 5.4,</p> <p>Responsibility & Flexibility:</p> <p>7.2, 7.3, 7.4, 7.7</p> <p>Ethics & Responsibilities:</p> <p>8.4</p> <p>Leadership & Teamwork:</p> <p>9.2, 9.3, 9.4, 9.7</p>

(4 hours)	<p>7. Understand and demonstrate interview skills to get the job:</p> <ul style="list-style-type: none"> a. do's and don'ts for job interviews b. how to dress for the job <p>8. Understand the importance of the continuous upgrading of job skills as it relates to certification, licensure, and/or renewal.</p>	<p>Technical Knowledge & Skills:</p> <p>10.1</p> <p>Demonstration & Application:</p> <p>11.1</p> <p>CTE Pathway:</p> <p>B1.1</p>
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Ana Martinez and Steven Mercado