<table>
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</thead>
<tbody>
<tr>
<td><strong>A. Appreciate and apply all personal and workplace safety procedures</strong></td>
<td>CA 3, HP 6, HP 7, SC 8</td>
<td>1.4, 1.5, 1.10, 3.1, 3.5, 4.7</td>
<td></td>
</tr>
<tr>
<td>1. Identify types, purposes, and operation of fire extinguishers and suppression resources.</td>
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<tr>
<td>2. Recognize when first aid is needed for occupational injuries and follow proper procedures.</td>
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<tr>
<td>3. Identify electrical hazards.</td>
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<tr>
<td>4. Demonstrate appropriate work place safety practices (e.g., electrical, hand tools, power tools, fall protection, PPE, lockout/tagout, and environmental hazards).</td>
<td></td>
<td></td>
<td>A.02, A.04, A.05</td>
</tr>
<tr>
<td>5. Identify hazard of RF radiation devices.</td>
<td></td>
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<tr>
<td>6. Demonstrate safe and proper use of AC line-operated equipment (e.g., isolation transformers, grounding, leakage current testing, and GFI).</td>
<td></td>
<td></td>
<td>C.06, C.07</td>
</tr>
<tr>
<td><strong>B. Test fundamental electronic circuits and devices</strong></td>
<td>CA 3, MA 1, MA 2 SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 4.1</td>
<td></td>
</tr>
<tr>
<td>1. Evaluate and test sources of DC and AC signals and power.</td>
<td></td>
<td></td>
<td>A.06, B.01, B.04</td>
</tr>
<tr>
<td>2. Apply Ohm's law.</td>
<td></td>
<td></td>
<td>B.05, C.01-C.05, C.15</td>
</tr>
<tr>
<td>3. Evaluate and test DC circuits (e.g., parallel and series-parallel).</td>
<td></td>
<td></td>
<td>B.03, B.24, C.15</td>
</tr>
<tr>
<td>4. Evaluate and test bridge circuits.</td>
<td></td>
<td></td>
<td>B.05, B.08-B.10, B.11, B.12, B.13, B.14-B.16, B.18-B.20</td>
</tr>
<tr>
<td>5. Evaluate and test magnetic and electromagnetic devices.</td>
<td></td>
<td></td>
<td>B.14-B.17</td>
</tr>
<tr>
<td>6. Evaluate and test transformers.</td>
<td></td>
<td></td>
<td>B.05, B.06, C.15</td>
</tr>
<tr>
<td>7. Evaluate and test capacitors.</td>
<td></td>
<td></td>
<td>C.06, C.14-C.17</td>
</tr>
<tr>
<td>8. Evaluate and test inductors.</td>
<td></td>
<td></td>
<td>B.07, B.08-C.10</td>
</tr>
<tr>
<td>9. Evaluate and test resistive devices.</td>
<td></td>
<td></td>
<td>B.07, B.08, C.11-C.13</td>
</tr>
<tr>
<td>10. Evaluate and test basic circuit controls (e.g., switches, fuses, and circuit breakers).</td>
<td></td>
<td></td>
<td>A.10</td>
</tr>
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## Measurable Learner Objective and Task Statement

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<tbody>
<tr>
<td>11. Evaluate and test AC series R/L/C (resistance-inductance-capacitance) and filter circuits.</td>
<td></td>
<td></td>
<td>C.21-C.29</td>
</tr>
<tr>
<td>12. Evaluate and test AC parallel R/L/C and filter circuits.</td>
<td></td>
<td></td>
<td>B.13, C.21-C.29</td>
</tr>
<tr>
<td>13. Evaluate and test time constants.</td>
<td></td>
<td></td>
<td>B.21-B.23</td>
</tr>
<tr>
<td><strong>C. Analyze and repair power supplies consistent with industry and safety standards</strong></td>
<td>CA 3, MA 1, SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1</td>
<td></td>
</tr>
<tr>
<td>1. Evaluate and test batteries.</td>
<td></td>
<td></td>
<td>B.02</td>
</tr>
<tr>
<td>2. Analyze and repair linear power supplies.</td>
<td></td>
<td></td>
<td>D.06-D.08, E.07-E.09</td>
</tr>
<tr>
<td>3. Analyze and repair voltage and current regulator circuits.</td>
<td></td>
<td></td>
<td>D.06-D.08, E.16-E.17 (excluding switching power supplies)</td>
</tr>
<tr>
<td><strong>D. Test semiconductor devices consistent with industry and safety standards</strong></td>
<td>CA 3, MA 1, SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1, 4.7</td>
<td></td>
</tr>
<tr>
<td>1. Evaluate and test diodes.</td>
<td></td>
<td></td>
<td>D.01, D.02, D.05-D.08</td>
</tr>
<tr>
<td>2. Evaluate and test transistors (e.g., BJT s and FETs).</td>
<td></td>
<td></td>
<td>D.03, D.04</td>
</tr>
<tr>
<td>3. Evaluate and test thyristors (e.g., SCRs, TRIACs, and DIACs).</td>
<td></td>
<td></td>
<td>D.15-D.17</td>
</tr>
<tr>
<td>5. Demonstrate proper semiconductor handling and replacing.</td>
<td></td>
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</tr>
<tr>
<td><strong>E. Analyze and repair amplifiers consistent with industry and safety standards</strong></td>
<td>CA 3, MA 1, SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1</td>
<td></td>
</tr>
<tr>
<td>3. Analyze and repair FET amplifier circuits.</td>
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<tbody>
<tr>
<td>5.</td>
<td>Analyze and repair multistage amplifiers.</td>
<td></td>
<td>E.01-E.03, F.03,  F.04</td>
</tr>
<tr>
<td>F.</td>
<td>Analyze and repair frequency generation equipment consistent with industry and safety standards</td>
<td>CA 3, MA 1, MA 2, SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1</td>
</tr>
<tr>
<td>1.</td>
<td>Analyze and repair oscillators.</td>
<td></td>
<td>E.20, E.21</td>
</tr>
<tr>
<td>3.</td>
<td>Apply the oscillator operation theory.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G.</td>
<td>Test equipment</td>
<td>CA 3, MA 1, MA 2, SC 1</td>
<td>1.10, 3.2</td>
</tr>
<tr>
<td>1.</td>
<td>Measure voltage, time, and frequency using an oscilloscope.</td>
<td></td>
<td>Partial A.09, C.02, C.03</td>
</tr>
<tr>
<td>2.</td>
<td>Measure voltage, current, and resistance using multimeters (e.g., VOM, EVM, and DVM).</td>
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<tr>
<td>3.</td>
<td>Operate signal generators (e.g., audio, RF, and function).</td>
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<tr>
<td>4.</td>
<td>Construct a circuit using a Quad bilateral switch.</td>
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<tr>
<td>H.</td>
<td>Analyze common optical devices</td>
<td>CA 3, MA 1, SC 1</td>
<td>1.10, 3.1, 3.2, 4.1</td>
</tr>
<tr>
<td>1.</td>
<td>Analyze common optical devices (e.g., photodetectors, emitters, optical isolators, and LEDs).</td>
<td></td>
<td>D.09</td>
</tr>
<tr>
<td>2.</td>
<td>Construct a circuit using fiber optic cable to transmit a digital or analog signal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.</td>
<td>Analyze and interpret digital logic system components</td>
<td>CA 3, MA 2, MA 3, MA 5, SC 1, SC 7</td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1</td>
</tr>
<tr>
<td>1.</td>
<td>Convert number systems and codes (e.g., binary, hex, ASCII and BCD).</td>
<td></td>
<td>F.01, F.05-F.07</td>
</tr>
<tr>
<td>2.</td>
<td>Analyze basic logic gate operations.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Interpret logic circuit truth tables.</td>
<td></td>
<td>F.05-F.07</td>
</tr>
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<tbody>
<tr>
<td>4. Analyze clock and timing circuit operations.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. Analyze combinational logic circuits for a given application.</td>
<td></td>
<td></td>
<td>D.09-D.11, F.08-F.10, F.22, F.23, F.26, F.27, F.30-F.33</td>
</tr>
<tr>
<td>6. Analyze counter and controller circuits for sequential logic applications.</td>
<td></td>
<td></td>
<td>F.11-F.16</td>
</tr>
<tr>
<td>7. Interpret digital data sheet information.</td>
<td></td>
<td></td>
<td>A.07, partial A.09</td>
</tr>
<tr>
<td>8. Analyze the operation of A/D and D/A converters.</td>
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<td>F.24,F.25</td>
</tr>
</tbody>
</table>

## J. Test microprocessors and microcontrollers

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<tr>
<td>1. Evaluate and test microprocessor bus signals.</td>
<td></td>
<td>1.8, 1.10, 3.1, 3.2, 3.5, 4.1</td>
<td>G.03-G.05</td>
</tr>
<tr>
<td>2. Evaluate and test IO devices.</td>
<td></td>
<td></td>
<td>G.01-G.02</td>
</tr>
<tr>
<td>3. Evaluate and test memory devices.</td>
<td></td>
<td></td>
<td>G.06-G.07</td>
</tr>
<tr>
<td>4. Evaluate and test dedicated microcontrollers.</td>
<td></td>
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</tr>
<tr>
<td>5. Write, deploy and test an original microcontroller program.</td>
<td>CA 3, MA 2, MA 3, SC 1</td>
<td>1.8, 1.10, 3.1, 3.2</td>
<td></td>
</tr>
</tbody>
</table>

## K. Construct circuits consistent with industry and safety standards

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<tr>
<td>1. Construct multistage circuits according to schematic diagrams.</td>
<td></td>
<td>A.07, A.08</td>
<td></td>
</tr>
<tr>
<td>2. Surface mount solder and desolder components (e.g., defective and replacement) to IPC standards.</td>
<td></td>
<td>A.05</td>
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</tr>
<tr>
<td>3. Thru-Hole solder and desolder components (e.g., defective and replacement).</td>
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<td>A.05</td>
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</tbody>
</table>

## L. Analyze and repair electronic telecommunication systems

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<tbody>
<tr>
<td>1. Analyze and repair circuits [e.g., phase-locked loop, IF (intermediate frequency), active filter, and RF (radio frequency)].</td>
<td>CA 1, CA 3, MA2, SC 1</td>
<td>1.8, 3.1, 3.2, 3.5, 3.7</td>
<td>C.31, C.32, E.18, E.04-E.06, E.24-E.26, E.27, E.28</td>
</tr>
<tr>
<td>2. Analyze and repair modulation systems.</td>
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<tr>
<td>3. Analyze and repair transmitters and receivers.</td>
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<tr>
<td>4. Test and align antennas.</td>
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<tr>
<td>5. Analyze and repair telephone and personal communication systems (PCS).</td>
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<tr>
<td>6. Install, test, and repair satellite receivers.</td>
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<tr>
<td>7. Operate frequency counters.</td>
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<tr>
<td><strong>M. Analyze and repair audio/video systems</strong></td>
<td>CA 1, CA 3, MA 2</td>
<td>1.8, 3.1, 3.2, 3.5, 3.7</td>
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</tr>
<tr>
<td>1. Analyze and repair record/play systems (e.g., analog audio, analog video, digital audio, and digital video).</td>
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<tr>
<td>2. Analyze and repair video display systems (e.g., digital and analog).</td>
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<tr>
<td>3. Analyze and repair audio and video reproduction systems.</td>
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<tr>
<td>4. Analyze and repair interactive audio and video systems.</td>
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<tr>
<td><strong>N. Install and maintain computer network systems</strong></td>
<td></td>
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<td>E.22, E.23</td>
</tr>
<tr>
<td>1. Analyze and repair transmitters and receivers (e.g., photonic and electronic).</td>
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<tr>
<td>2. Analyze and repair transmission mediums.</td>
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<tr>
<td>3. Install, test, and repair physical layer of a network.</td>
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<tr>
<td>4. Install protocol stack.</td>
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<tr>
<td>5. Install network software.</td>
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<tr>
<td><strong>O. Install and maintain computer software and hardware components</strong></td>
<td>CA 1, CA 3, MA 4</td>
<td>1.8, 3.1, 3.2</td>
<td>H.01, H.02</td>
</tr>
<tr>
<td>1. Test computer component functions (e.g., microprocessor, memory, and I/O).</td>
<td></td>
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<tr>
<td>2. Install and configure hardware components (e.g., drives, cards, memory expansion, motherboard, and disk interfaces).</td>
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<tr>
<td>3. Install and configure operating system software (e.g., operating and supporting).</td>
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<tr>
<td>4. Test and maintain computer peripherals.</td>
<td></td>
<td></td>
<td>H.03, H.05</td>
</tr>
<tr>
<td><strong>P. Install and maintain automatic identification and data capture systems</strong></td>
<td>CA 1, CA 3, MA 1, SC1, SC2</td>
<td>1.8, 3.1, 3.2, 3.5, 3.7</td>
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<tr>
<td>1. Analyze, install, configure, repair and maintain bar code readers and printers.</td>
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<tr>
<td>2. Analyze, install, configure, repair and maintain magnetic stripe programmers and readers.</td>
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<tr>
<td>3. Install and configure smart card programmers and readers.</td>
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<tr>
<td>4. Analyze, install, configure, repair and maintain radio frequency identification (RFID) systems.</td>
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<tr>
<td>5. Analyze, install, configure, repair and maintain electronic article surveillance (EAS) systems.</td>
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<tr>
<td>6. Analyze, install, configure, repair and maintain real time locating systems (RTLS).</td>
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<tr>
<td>7. Install and configure machine vision.</td>
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<tr>
<td>8. Install and configure magnetic ink character recognition (MICR).</td>
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<tr>
<td>10. Analyze, install, configure, repair and maintain biometric identification systems (e.g., retinal scanners, hand geometry, and voice patterns).</td>
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</tr>
<tr>
<td><strong>Q. Install, analyze, and repair industrial electronic systems</strong></td>
<td>CA 1, CA 3, MA 1, MA 2, SC 1, SC 2</td>
<td>1.8, 3.1, 3.2, 3.5, 3.7</td>
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</tr>
<tr>
<td>1. Design and create simple ladder logic diagrams/programs.</td>
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<tr>
<td>2. Install and configure programmable logic controllers (e.g., PLC code).</td>
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<tr>
<td>3. Analyze and repair motor control systems (e.g., starters and control wiring, and overcurrent protection).</td>
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<tr>
<td>5. Identify and test sensors.</td>
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<tr>
<td>6. Analyze and repair solid-state power controls.</td>
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<tr>
<td>7. Analyze, repair, and maintain computer-controlled systems (e.g., CNC and robotics).</td>
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**Electronics** (47.0101)

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<td>R. <strong>Demonstrate leadership skills in the classroom, industry, and society</strong></td>
<td>CA 1, CA 4, CA 6, SS 6, HP 2</td>
<td>2.1, 2.3, 2.6, 4.3, 4.4, 4.6, 4.8</td>
<td></td>
</tr>
<tr>
<td>1. Demonstrate an understanding of SkillsUSA, its structure, and activities.</td>
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<tr>
<td>2. Demonstrate an understanding of one's personal values.</td>
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<tr>
<td>3. Perform tasks related to effective personal management skills.</td>
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<tr>
<td>4. Demonstrate interpersonal skills.</td>
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<tr>
<td>5. Demonstrate etiquette and courtesy.</td>
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<tr>
<td>6. Demonstrate effectiveness in oral and written communication.</td>
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<tr>
<td>7. Develop and maintain a code of professional ethics.</td>
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<tr>
<td>8. Maintain an appropriate professional appearance.</td>
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<td>10. Perform basic parliamentary procedures in a group meeting.</td>
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<td>S. <strong>Explain and demonstrate skills in a specialization area identified by the instructor</strong></td>
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</table>

*Measurable Learner Objectives are bold font.*

CA = Communication Arts  
MA = Math  
HP = Health/Physical Education  
SS = Social Studies  
SC = Science  
FA = Fine Arts