

K to 12 TECHNOLOGY AND LIVELIHOOD EDUCATION

**INDUSTRIAL ARTS – ELECTRICAL INSTALLATION AND MAINTENANCE  
(Exploratory)**

Content Standard	Performance Standard	Learning Competencies	Project/ Activities	Assessment	Duration
<b>LESSON 1: PREPARE ELECTRICAL MATERIALS AND TOOLS</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>Identify materials and tools applicable to a specific job               <ul style="list-style-type: none"> <li>➤ Electrical tools and equipment</li> <li>➤ Electrical materials</li> </ul> </li> <li>Common splices and joints</li> <li>Extension cord</li> </ul>	<ol style="list-style-type: none"> <li>Tools and materials are identified as per job requirement.</li> <li>Tools are classified according to their function as per job requirements.</li> <li>Materials are classified according to their uses to a specific project.</li> <li>Tools and materials are selected as per job requirement.</li> </ol>	<p>LO1. Identify electrical materials and tools applicable to a specific job</p>	<ol style="list-style-type: none"> <li>Skin wires using the following tools:               <ol style="list-style-type: none"> <li>electricians knife,</li> <li>combination pliers &amp; side cutting pliers,</li> <li>wire Stripper.</li> </ol> </li> <li>Connecting the skinned wires to the terminals of:               <ol style="list-style-type: none"> <li>bulb receptacles,</li> <li>switches, and</li> <li>fuse boxes.</li> </ol> </li> <li>Perform Splices and joints,</li> <li>Making an extension cord.</li> </ol>	<ul style="list-style-type: none"> <li>Written test</li> <li>Performance test</li> </ul>	12 hours
<ul style="list-style-type: none"> <li><i>Different forms</i></li> <li><i>Job order slip</i></li> <li><i>Tools and materials requisition slip</i></li> <li><i>Borrower's Slip</i></li> <li><i>Requisition procedures</i></li> </ul>	<ol style="list-style-type: none"> <li>Needed materials and tools are listed as per job requirement.</li> <li>Materials and tools are requested according to the list prepared.</li> <li>Requests are done as per company standard operating procedures (SOP).</li> <li>Materials and tools are substituted provided required materials and tools are unavailable without sacrificing</li> </ol>	<p>LO2. Request appropriate electrical materials and tools</p>	<ol style="list-style-type: none"> <li>Identify different types of forms use in the shop and explain how it is being used.</li> <li>Simulate student to act as tool keeper and the other is a borrower.</li> </ol>	<ul style="list-style-type: none"> <li>Direct observation</li> <li>Written test</li> <li>Performance test</li> </ul>	

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	cost and quality of work.				
<ul style="list-style-type: none"> <li>• Procedures in receiving tools and materials</li> <li>• Proper inspection of tools and materials received.</li> <li>• Proper handling of tools and materials.</li> </ul>	<ol style="list-style-type: none"> <li>1. Materials and tools are received and inspected as per quantity and specification based on requisition.</li> <li>2. Tools and materials are checked for damages and manufacturing defects.</li> <li>3. Materials and tools received are handled with appropriate safety devices.</li> <li>4. Materials and tools are set aside to appropriate location nearest to the workplace.</li> </ol>	LO3. Receive and inspect electrical materials	<ol style="list-style-type: none"> <li>1. Simulation:               <ol style="list-style-type: none"> <li>a. One student act as a supplier and the other as the receiver of supplies</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Written test</li> <li>• Performance test</li> </ul>	

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<b>LESSON 2: PERFORM MENSURATIONS AND CALCULATIONS</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>Measuring Instruments/Measuring Tools</li> <li>Proper handling of measuring instruments</li> <li>Ohms Law</li> </ul>	<ol style="list-style-type: none"> <li>Measuring tools are selected/identified as per object to be measured or job requirements.</li> <li>Measurements are obtained according to job requirements.</li> <li>Computation for resistance, current and voltage using Ohms Law are obtained.</li> </ol>	<p>LO1.Select electrical measuring instruments.</p>	<ol style="list-style-type: none"> <li>Perform measurement of:               <ol style="list-style-type: none"> <li>teachers table,</li> <li>the classroom.</li> </ol> </li> <li>Measure the ff.:               <ol style="list-style-type: none"> <li>Voltage of the outlet,</li> <li>Voltage of a dry cell battery, and</li> <li>Resistance of resistors.</li> </ol> </li> <li>Compute for :               <ol style="list-style-type: none"> <li>Resistance</li> <li>Current</li> <li>Voltage</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>Actual demonstration</li> <li>Direct observation</li> <li>Written test</li> <li>Performance test</li> </ul>	<p>6 hours</p>
<ul style="list-style-type: none"> <li>Kinds of measurement</li> <li>Dimensions</li> <li>Conversion</li> </ul>	<ol style="list-style-type: none"> <li>Numerical computations are self-checked and corrected for accuracy.</li> <li>Accurate measurements are obtained according to job requirements.</li> <li>Identified and converted systems of measurement according to job requirements.</li> <li>Measured work pieces according to job requirements.</li> </ol>	<p>LO2.Carry out measurements and calculations.</p>	<ol style="list-style-type: none"> <li>Read the following measurements:               <ol style="list-style-type: none"> <li>Inch Graduation</li> <li>Centimeter graduation</li> </ol> </li> <li>Solving problems:               <ol style="list-style-type: none"> <li>Conversion of English unit to Metric unit and vice versa.</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>Direct observation</li> <li>Written test</li> <li>Performance test</li> </ul>	

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<b>LESSON 3: INTERPRET TECHNICAL DRAWINGS AND PLANS</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>• Drawing electrical symbols and signs</li> <li>• Drawing wiring diagrams:               <ul style="list-style-type: none"> <li>➢ Pictorial</li> <li>➢ Schematic</li> </ul> </li> </ul>	<ol style="list-style-type: none"> <li>1. Sign, symbols, and data are identified according to job specifications.</li> <li>2. Sign, symbols and data are determined according to classification or as appropriate in drawing.</li> </ol>	<p>LO1. Analyze signs, electrical symbols and data.</p>	<ol style="list-style-type: none"> <li>1. Draw the different signs commonly used in the industry in illustration board or any hard carton board.</li> <li>2. Identify the different electrical symbols</li> <li>3. Draw wiring diagram:               <ol style="list-style-type: none"> <li>a. Pictorial</li> <li>b. Schematic</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Written test</li> <li>• Performance test</li> </ul>	<p>6 hours</p>
<ul style="list-style-type: none"> <li>• Technical plans and Schematic Diagram               <ul style="list-style-type: none"> <li>➢ Electrical plan</li> </ul> </li> <li>• Symbols and Abbreviations</li> </ul>	<ol style="list-style-type: none"> <li>1. Necessary tools, materials and equipment are identified according to the plan.</li> <li>2. Components, assemblies or object are recognized as per job requirement.</li> <li>3. Dimensions and specification are identified according to job requirements.</li> </ol>	<p>LO2. Interpret technical drawings and plans.</p>	<ol style="list-style-type: none"> <li>1. Draw an electrical plan.</li> </ol>	<ul style="list-style-type: none"> <li>• Direct observation</li> <li>• Written test</li> <li>• Performance</li> </ul>	

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<b>LESSON 4: MAINTAIN TOOLS AND EQUIPMENT</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>Types of Tools and Equipments                             <ul style="list-style-type: none"> <li>➤ Safety reminders</li> </ul> </li> <li>Classification of functional and non-functional tools</li> <li>Uses of Personal Protective Equipment (PPE).</li> </ul>	<ol style="list-style-type: none"> <li>Tools and equipment are identified according to classification/ specification and job requirements.</li> <li>Non-functional tools and equipment are segregated and labeled according to classification.</li> <li>Safety of tools and equipment are observed in accordance with manufacturer's instructions</li> <li>Conditions of PPE are checked in accordance with manufacturer's instructions.</li> </ol>	LO1. Check condition of tools and equipment.	<ol style="list-style-type: none"> <li>Identify hand tools, pneumatic tools and electric power tools.</li> </ol>	<ul style="list-style-type: none"> <li>Direct observation</li> <li>Written test</li> <li>Performance test</li> </ul>	8 hours
<ul style="list-style-type: none"> <li>Types uses of lubricants</li> <li>Types and uses of cleaning materials/solvent</li> <li>OSHC workplace regulations</li> <li>Types and uses of measuring instruments and equipment.</li> <li>Preventive maintenance techniques and</li> </ul>	<ol style="list-style-type: none"> <li>Lubricants are identified according to types of equipment.</li> <li>Tools and equipment are lubricated according to preventive maintenance schedule or manufacturer's specifications.</li> <li>Measuring instruments are checked and calibrated in accordance with</li> </ol>	LO2. Perform basic preventive maintenance.	<ol style="list-style-type: none"> <li>Perform cleaning and lubricating of tools.</li> <li>Calibrate measuring tools.</li> <li>Perform 5's.</li> </ol>	<ul style="list-style-type: none"> <li>Direct observation</li> <li>Written test</li> <li>Performance test</li> </ul>	

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procedures.	manufacturer's instructions. 4. Tools are cleaned and lubricated according to standard procedures 5. Defective equipment and tools are inspected and replaced according to manufacturer's specification. 6. Work place is cleaned and kept in safe state in line with OSHC regulations.				
<ul style="list-style-type: none"> <li>• Inventory of electrical tools and equipment</li> <li>• Tools and Equipment Handling</li> <li>• Tool safe-keeping/storage</li> </ul>	<ol style="list-style-type: none"> <li>1. Inventory of tools, instruments, and equipment are conducted and recorded as per company practices.</li> <li>2. Tools are inspected, and replaced after use.</li> <li>3. Tools and equipment are stored safely in accordance with manufacturer's specifications or company procedures.</li> </ol>	LO3. Store electrical tools and equipment.	1. Preparing inventory of tools and equipment.	<ul style="list-style-type: none"> <li>• Practical exam</li> <li>• Direct observation</li> <li>• Written test</li> </ul>	

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<b>LESSON 5: PRACTICE OCCUPATIONAL HEALTH AND SAFETY PROCEDURES</b>					
<p><i>Demonstrate understanding of/on:</i></p> <ul style="list-style-type: none"> <li>Hazards and risks identification and control</li> <li>Organizational safety and health protocol</li> <li>Threshold limit value (TLV)</li> <li>OHS indicators</li> </ul>	<ol style="list-style-type: none"> <li>Workplace hazards and risks are identified and clearly explained.</li> <li>Hazards/risks and their corresponding indicators are identified in with the company procedures.</li> <li>Contingency measures are recognized and established in accordance with organizational procedures.</li> </ol>	LO1. Identify hazards and risks.	<ol style="list-style-type: none"> <li>Making an internet research on different company hazards and risks.</li> </ol>	<ul style="list-style-type: none"> <li>Written test</li> </ul>	10 hours
<ul style="list-style-type: none"> <li>TLV table</li> <li>Philippine OHS standards</li> <li>Effects of hazards in the workplace</li> <li>Ergonomics</li> <li>ECC Regulations</li> </ul>	<ol style="list-style-type: none"> <li>Terms of maximum tolerable limits are identified based on threshold limit values (TLV).</li> <li>Effects of hazards are determined.</li> <li>OHS issues and concerns are identified in accordance with workplace requirements and relevant workplace OHS legislation.</li> </ol>	LO2. Evaluate hazards and risks.	<ol style="list-style-type: none"> <li>Present a video regarding workplace hazards and risk.</li> <li>Simulation</li> </ol>	<ul style="list-style-type: none"> <li>Written test</li> <li>Performance test</li> </ul>	
<ul style="list-style-type: none"> <li>Safety regulations</li> <li>Clean air act</li> <li>Electrical and fire safety code</li> </ul>	<ol style="list-style-type: none"> <li>OHS procedures for controlling hazards and risk are strictly followed.</li> <li>Procedures in dealing with</li> </ol>	LO3. Control hazards and risks.	<ol style="list-style-type: none"> <li>Do an information campaign                             <ol style="list-style-type: none"> <li>Poster making on safety rules and</li> </ol> </li> </ol>	<ul style="list-style-type: none"> <li>Written test</li> </ul>	

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<ul style="list-style-type: none"> <li>• Waste management</li> <li>• Disaster preparedness and management</li> <li>• Contingency measures and procedures</li> </ul>	<p>workplace accidents, fire and emergencies are followed in accordance with the organization’s OHS policies.</p> <p>3. Personal protective equipment (PPE) is correctly used in accordance with organization’s OHS procedures and practices.</p> <p>4. Procedures in providing appropriate assistance in the event of workplace emergencies are identified in line with the established organizational protocol.</p>		<p>regulations</p> <p>b. Proper waste management exercises</p>		
<ul style="list-style-type: none"> <li>• Operational health and safety procedure, practices and regulations</li> <li>• Emergency-related drills and training</li> </ul>	<p>1. Procedures in emergency related drill are strictly followed in line with the established organization guidelines and procedures.</p> <p>2. OHS personal records are filled up in accordance with workplace requirements.</p> <p>3. PPE are maintained in line with organization guidelines and procedures.</p>	<p>LO4.Maintain occupational health and safety awareness.</p>	<p>1. Do an emergency training exercises:</p> <ul style="list-style-type: none"> <li>a. Fire drill</li> <li>b. Life saving drill</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration</li> <li>➤ Interview</li> <li>➤ Written examination</li> <li>➤ Portfolio assessment</li> </ul>	
					<b>42 hours</b>