



# Electromechanical/Mechatronics

Youth Apprenticeship

## ELECTROMECHANICAL/MECHATRONICS

Electromechanical/Mechatronics youth apprentices gain skills related to operating, testing, maintaining, or adjusting unmanned, automated, servomechanical, or electromechanical equipment. Apprentices must adhere to industry safety and security standards.

**Length of Apprenticeship:** One year

## COMPETENCIES

Youth Apprentices must complete a **total of 15** competencies. **Thirteen** of the 15 competencies listed below must be complete. Employers can substitute up to **2** competencies with other occupationally appropriate skills. Substitutions must be added to the competency list for assessment. Note that where necessary, skills can be simulated.

\*\*\*Students who completed one year of Electromechanical/Mechatronics or a previous Manufacturing YA program do *not* need to repeat the Manufacturing Fundamentals Competencies.

Manufacturing Fundamentals Competencies	Electromechanical/Mechatronics Competencies
<ol style="list-style-type: none"> <li>1. Focus on customer needs</li> <li>2. Use various instruments</li> <li>3. Operate tools and equipment safely</li> <li>4. Practice quality assurance principles</li> <li>5. Follow personal safety requirements</li> <li>6. Maintain a safe work environment</li> <li>7. Demonstrate professional role to be used in an emergency</li> </ol>	<ol style="list-style-type: none"> <li>1. Use test instruments</li> <li>2. Read blueprints and schematics</li> <li>3. Install electrical and electronic parts</li> <li>4. Use hand tools</li> <li>5. Install mechanical equipment</li> <li>6. Troubleshoot electronic systems</li> <li>7. Use precision measuring instruments</li> <li>8. Procure parts</li> </ol>

## REGISTERED APPRENTICESHIP BRIDGING OPPORTUNITIES

Some of the related instruction courses can bridge into the following registered apprenticeship:

- Mechatronics

## POST-SECONDARY PATHWAY OPPORTUNITIES

There are several post-secondary pathway opportunities in this area. Following is partial list.

- Mechatronics Basics Technical Diploma
- Electromechanical Maintenance Technician Technical Diploma



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## ON-THE-JOB LEARNING PERFORMANCE STANDARDS GUIDE

### YOUTH APPRENTICE INFORMATION

<b>Youth Apprentice Name</b>	
<b>YA Coordinator</b>	<b>YA Consortium</b>
<b>School District</b>	<b>High School Graduation Date</b>

### REQUIREMENTS

Youth apprentices must complete ALL the items listed below. Check completed areas.

- Competency checklist
- Employability Skills checklist (in this job book) or the DPI Employability Skills Certificate
- Related instruction equal to 1 high school credit or at least 3 college credits
- Minimum of 450 work hours

### HOURS

Record the hours the youth apprentice worked.

<b>Total Hours Employed</b>	<b>Company Name</b>	<b>Telephone Number</b>

## COMPETENCIES

Youth Apprentices must complete a **total of 15** competencies. **Thirteen** of the 15 competencies listed below must be complete. Employers can substitute up to **2** competencies with another occupationally appropriate skills. Substitutions must be added to the competency list for assessment. Note that where necessary, skills can be simulated.

### Rating Scale

3: Exceeds entry level criteria | Requires minimal supervision | Consistently displays this behavior

2: Meets entry level criteria | Requires some supervision | Often displays this behavior

1: Needs improvement | Requires much assistance and supervision | Rarely displays this behavior

### Manufacturing Fundamentals

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p><b>1. Focus on customer needs</b></p> <ul style="list-style-type: none"> <li>Identify internal and external customers impacted by the production process</li> <li>Satisfy internal and external customer's expectations</li> <li>Collaborate with team</li> <li>Assist work site professional to keep internal and/or external customers informed of project progress and decisions that may affect them</li> <li>Define the impact of the Voice of the Customer</li> <li>Determine the impact of your work to the internal and external customer</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>2. Use various instruments</b></p> <ul style="list-style-type: none"> <li>Consider the degree of precision required by the part feature</li> <li>Choose correct measuring instrument for task</li> <li>Verify equipment is available for use and in working order</li> <li>Verify equipment preventative maintenance and/or calibration</li> <li>Inspect tools and work area for safety considerations</li> <li>Clean and adjust measuring instrument prior to use</li> <li>Use gauges, calipers, and micrometer instruments</li> <li>Use semi-precision and precision layout tools</li> <li>Use digital gauges, checking fixtures</li> <li>Use digital scales, thermometers</li> <li>Confirm measurement accuracy</li> <li>Record measurement correctly including unit of measurement at proper interval</li> <li>Calibrate, clean, and store measuring instruments properly</li> <li>Convert standard to metric – metric to standard measurement units</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p><b>3. Operate tools and equipment safely</b></p> <ul style="list-style-type: none"> <li>• Operate only tool/equipment that he/she is trained on</li> <li>• Choose correct tool/equipment for the task</li> <li>• Follow tool check list</li> <li>• Verify tool/equipment is available for use and in working order</li> <li>• Verify tool/equipment is current for preventative maintenance and/or calibration</li> <li>• Wear appropriate Personal Protective Equipment (PPE)</li> <li>• Inspect tool/equipment and work area for safety considerations</li> <li>• Prepare tool/equipment for safe operation</li> <li>• Operate tool/equipment safely with guarding devices</li> <li>• Monitor tool/equipment for safe operation while operating</li> <li>• Compare tool/equipment performance regularly to optimal equipment operations</li> <li>• Follow facility procedures for clean-up and shut down after use</li> <li>• Perform required preventative maintenance procedures</li> <li>• Report abnormal tool/equipment conditions</li> <li>• Properly shuts down and labels any tool/equipment that is not operating as expected</li> <li>• Follow Lock Out/Tag Out procedures as applicable</li> <li>• Document use and maintenance</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>4. Practice quality assurance principles</b></p> <ul style="list-style-type: none"> <li>• Inspect materials/piece/product at all stages of production</li> <li>• Identify quality or condition of materials/piece/product</li> <li>• Monitor materials, processes, equipment, tools, and products throughout the production process</li> <li>• Inspect final product/piece to ensure it meets specifications</li> <li>• Identify and segregate materials and/or product that do not meet specification</li> <li>• Communicate with work site professional if materials/product do not meet requirements</li> <li>• Document all quality checks</li> <li>• Participate in root-cause analysis of process/product</li> <li>• Take ownership of work</li> <li>• Collaborate with work site professional on corrective action</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p><b>5. Follow personal safety requirements (safety)</b></p> <ul style="list-style-type: none"> <li>• Participate in required safety training</li> <li>• Follow all worksite guidelines for personal safety</li> <li>• Apply principles of proper body mechanics</li> <li>• Report exposures, injuries, near misses, or accidents, personal or to others immediately</li> <li>• Locate key information on Material Safety Data Sheets (MSDS)</li> <li>• Handle and dispose of any hazardous materials appropriately</li> <li>• Operate equipment that he/she is trained on</li> <li>• Adhere to equipment safety standards</li> <li>• Visually inspect equipment before operation</li> <li>• Wear required Personal Protective Equipment (PPE) at all times</li> <li>• Follow company emergency action plan</li> <li>• Identify hazardous conditions and restricted areas in the workplace</li> <li>• Avoid pinch points</li> <li>• Be aware of surroundings</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<p><b>6. Maintain a safe work environment (safety)</b></p> <ul style="list-style-type: none"> <li>• Comply with posted safety warnings and symbols</li> <li>• Identify unsafe conditions and/or work habits</li> <li>• Report unsafe conditions and/or work habits</li> <li>• Help maintain a clean and safe working environment free of debris and obstacles</li> <li>• Maintain clean, organized work area</li> <li>• Use hazardous materials according to company procedure</li> <li>• Report any indications of insects or pests, if necessary</li> <li>• Follow appropriate Lock out – tag out procedures</li> <li>• Adhere to Occupational Safety and Health Administration (OSHA) Safety guidelines</li> <li>• Follow rules for operating equipment (Powered Industrial Vehicle PIV)</li> <li>• Identify applicable Emergency Stops</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p><b>7. Demonstrate professional role to be used in an emergency (safety)</b></p> <ul style="list-style-type: none"> <li>• Participate in emergency safety simulations and drills</li> <li>• Describe company’s policy and procedures for work site incidents, accidents, electrical, fire, tornado, bomb threats, robbery, hostage situations, and other emergency situations</li> <li>• Identify the closest fire alarms and emergency exits</li> <li>• Identify the fire extinguishers</li> <li>• Identify appropriate alarms and procedures for using alarms</li> <li>• Contact emergency personnel in the event of an emergency</li> <li>• Contribute to emergency incident documentation</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			

**Electromechanical/Mechatronics**

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<p><b>1. Use test instruments</b></p> <ul style="list-style-type: none"> <li>• wear proper PPE</li> <li>• adhere to arc flash safety</li> <li>• operate multimeters</li> <li>• operate micrometers</li> <li>• use rules, tapes, and related measuring devices</li> <li>• determine dimensions and tolerances</li> <li>• measure voltage</li> <li>• measure current</li> <li>• measure resistance</li> <li>• set and use torque wrench</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<b>2. Read blueprints and schematics</b> <ul style="list-style-type: none"> <li>• identify symbols</li> <li>• describe parts and specifications</li> <li>• interpret parts and specifications</li> <li>• describe dimensioning information on industrial parts</li> <li>• identify use of prints in troubleshooting equipment and devices</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>3. Install electrical and electronic parts</b> <ul style="list-style-type: none"> <li>• interpret electrical schematics</li> <li>• install electrical field devices</li> <li>• plan control cabinet layout</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. Use hand tools</b> <ul style="list-style-type: none"> <li>• use measuring devices</li> <li>• operate drilling tools</li> <li>• operate cutting tools</li> <li>• operate fastening tools</li> <li>• use bending and shaping equipment</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>5. Install mechanical equipment</b> <ul style="list-style-type: none"> <li>• assemble tools</li> <li>• run wires</li> <li>• terminate wires</li> <li>• label wire</li> <li>• assemble basic panels</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>6. Troubleshoot electronic systems</b> <ul style="list-style-type: none"> <li>• wear proper ppe</li> <li>• follow safety procedures</li> <li>• identify common testing procedures</li> <li>• inspect electronic system</li> <li>• document troubleshooting steps and results</li> <li>• troubleshoot ac/dc circuits</li> <li>• troubleshoot with plc logic</li> <li>• research solutions to problems</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7. Use precision measuring instruments</b> <ul style="list-style-type: none"> <li>• identify job-appropriate measuring instrument</li> <li>• use micrometers</li> <li>• use calipers</li> <li>• use gages</li> <li>• use indicators</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Competency and Rating Criteria	Minimum Rating of 2 for EACH Check Rating		
	1	2	3
<b>8. Procure parts</b> <ul style="list-style-type: none"> <li>• identify parts needed</li> <li>• research needed parts</li> <li>• determine part source</li> <li>• document part order</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Competency Substitute</b> (if you replaced a competency above, note the competency and rating)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments:</b>			