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# **Appendix A**

**INDUSTRIAL AUTOMATION & MECHATRONICS TECHNICIAN**

**WORK PROCESS SCHEDULE**

**AND**

**RELATED INSTRUCTION OUTLINE**

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## Appendix A

### WORK PROCESS SCHEDULE INDUSTRIAL AUTOMATION & MECHATRONICS TECHNICIAN

**O\*NET-SOC CODE:** 49-2094.00      **RAPIDS CODE:** 2014CB

This schedule is attached to and a part of these Standards for the above identified occupation.

#### 1. APPRENTICESHIP APPROACH

☐ Time-based      ☒ Competency-based      ☐ Hybrid

#### 2. TERM OF APPRENTICESHIP

The term of the **Industrial Automation & Mechatronics Technician** is **Competency Based** supplemented by the minimum required 144 hours of related training instruction per year.

#### 3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is: 1 Apprentice(s) to 1 Journeyworker(s).

#### 4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on either a percentage or a dollar amount of the current hourly journeyworker wage rate, which is: **\$29.68**/per hour.

Period	Wage (Hourly)	Description
1	\$16.00	6 months + hours
2	\$16.50	6 months + hours
3	\$17.00	6 months + hours
4	\$17.50	6 months + hours
5	\$18.00	6 months + hours
6	\$18.50	6 months + hours
7	\$19.00	6 months + hours
8	\$19.50	6 months + hours



## **5. PROBATIONARY PERIOD**

Every applicant selected for apprenticeship will serve a probationary period of **2000** hours.

## **6. SELECTION PROCEDURES**

Applicants will be selected by individual participating employer sponsors using selection method #4\_, as outlined in the California Code of Regulations, Title 8, Chapter 2, Part 1, Section 215, Chapter 6, from a pool of eligible created during the established recruiting process in accordance with the State and Federal Equal Opportunity regulations.

1. Minimum age of all applicants shall be 16 years. There is no maximum age;
2. Educational prerequisite for entry: High school diploma or GED/equivalent;
3. Physical prerequisites: Applicant must have the ability to safely perform the work of the trade/occupation. Physical examination required for entry is at no cost to the applicant and the physical exam will be defined by the individual employersponsor.
4. Written Test: Administered by Faculty and/or Program Coordinator
5. Oral Interview: None Required
6. All applicants will be notified in writing of Acceptance or Rejection.
7. If rejected, reasons for rejections will be stated.
8. A pool of applicants will be established and maintained for two years as follows:
  - a. Interested applicants will have an opportunity to attend a publicorientation and enroll in the program's employment preparation course. Completers of the course will be guided through the development of a resume and job application, which will be published to participating employer partners.
9. And applicants will be employed as follows:
  - a. Applicants will follow directives of individual employer partners throughjob application, interview and pre-screening.
  - b. Applicant's prior work experience and training will be evaluated by the committee at the time of registration, and appropriate credit will be given toward a higher apprenticeship and/or wage bracket. Apprentice applicant must verify, in writing, all past experience/education for consideration of credit.
  - c. Each participating employer sponsor, upon determination of the need to employ and train an apprentice, will register an apprentice after upholding a fair and consistent sourcing, recruiting, and evaluation process;
  - d. Participating employer sponsors will report recruitment and selection data annually to the Program Name Apprenticeship Training Program coordinator/director;
  - e. Minimum age of all applicants shall be 16 years. There is no maximum age;
  - f. Educational prerequisite for entry: High school diploma or GED/equivalent;
  - g. Physical prerequisites: Applicant must have the ability to safely perform the work of the trade/occupation. Physical examination required for entry is at no cost to the applicant and the physical exam will be defined by the individual employer sponsor.
  - h. Drug screening prior to employment, as well as random drug screening throughout the apprenticeship program may be required for selection and/or continued participation/employment;
  - i. General aptitude or other skills test shall be defined by the individual employer sponsor and administered by the employer sponsor or its delegated agent;
  - j. Oral interview is per employer sponsor's individual selection procedures with selection documentation to be on file with the Program Name program director/coordinator.

# **WORK PROCESS SCHEDULE** **INDUSTRIAL AUTOMATION & MECHATRONICS TECHNICIAN**

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<b>Implement &amp; Remove safety protocols Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Review policy and procedures for job assignment (i.e., safety manual)		
B. Implement communication with all affected parties (i.e., operator, floor supervisor)		
C. Assess equipment to identify energy source		
D. Acquire PPE and tools according to safety protocol (i.e., lock machine)		
E. Secure energy sources		
F. Install lockout protective devices		
G. Verify that energy sources are secure		
H. Notify supervisor if required by policy / procedure		
I. Comply with safety requirements & standards and initiate safety protocols at all times		
J. Identify, report, and take corrective action on unsafe and out-of-compliance conditions and behaviors regarding safety		
K. Comply with environmental regulations		
L. Verify work is complete by observation to ensure there are no secondary hazards		
M. Remove all safety equipment		
N. Communicate to all parties that machine can be brought back into service		
O. Restore energy source (air, fluids, thermal, electricity, etc.)		
P. Test for proper operation		
Q. Return machine to service		
R. Perform housekeeping		
<b>Establish baseline of normal operating parameters Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Research manufacturers' recommended specifications (i.e. manual)		
B. Test drive system, control system, and energy source		
C. Compare theoretical output to actual application		
D. Apply data from comparison and apply to maintenance plan		
<b>Maintain, troubleshoot, and repair programmable logic controllers (PLCs)</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Preventative maintenance of PLCs		
B. Receive work order from management		
C. Review instructions for maintenance of machine on work order		
D. Gather necessary support, tools, supplies, and PPE equipment		
E. Ensure test equipment and tools are properly calibrated and certified when applicable		
F. Evaluate and inspect drive system (i.e. test for over current)		
G. Evaluate and inspect the air and lubrication system (i.e. replace air filter)		
H. Evaluate and inspect control system (i.e., visually inspect contactors)		
I. Replace necessary components according to protocol		
J. Complete all necessary paperwork / data entry to certify completion and maintain accountability		
K. Reclaim, recycle, or dispose of fluids, refrigerants, materials and waste		
L. Perform housekeeping		
M. Test for functionality and safety; compare test results to baseline operating data		
N. Change battery		
O. Clean control cabinet		
P. Inspect wires, inspect all connections		

Q. Interpret PLC diagram to facilitate troubleshooting of equipment input/output signals		
R. Preparation for Repair: Obtain all necessary parts for repair or installation, gather necessary support, tools, supplies, and PPE equipment, ensure test equipment and tools are properly calibrated and certified when applicable.		
S. Communication: Fill out maintenance and repair logs, communicate job-specific needs, suggest ways to prevent future equipment malfunction or improve equipment performance, promote teamwork and continuous improvement.		
T. Technical & Administrative Duties: Maintain manual and electronic records, databases, and reports, obtain, and maintain proficiency in current and new technologies, acquire and maintain industry certifications		
<b>Troubleshoot and Repair of machine / mechanical system / electrical system failure</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Respond to notification of machine failure (i.e., work order)		
B. Perform diagnostic testing and root cause analysis		
C. Consult blueprints and schematics as necessary		
D. Interview operator		
E. Observe machine failure		
F. Diagnose specific machine failure (i.e., obstructions)		
G. Indicate wires and IO		
H. Remove broken part(s)		
I. Install / connect replacement part(s) and/or sub-program components (e.g., photo eyes, frequency drives, controllers)		
J. Document completion of work order		
K. Perform welding functions (Weld, braze and solder copper, brass, aluminum, silver, and other materials)		
L. Fabricate metal parts, frames, stands, and brackets, working from blueprints, diagrams, written and verbal instructions		
M. Reclaim, recycle, or dispose of fluids, refrigerants, materials and waste		
N. Communication: Fill out maintenance and repair logs, communicate job-specific needs, suggest ways to prevent future equipment malfunction or improve equipment performance, promote teamwork and continuous improvement		
O. Technical & Administrative Duties: Maintain manual and electronic records, databases, and reports, obtain and maintain proficiency in current and new technologies, acquire and maintain industry certifications.		
<b>Maintaining parts and components inventory Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Check parts inventory / stock		
B. Order parts as needed per diagnosis		
C. Participate in periodic inventory audits		
D. Where applicable, part numbers are entered into electronic tracking system		
E. Search approved web sites for parts or tools as needed		
<b>Maintaining and repairing computer networks Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
A. Maintain hardware (switches, routers, cards, fiber)		
B. Communicate and collaborate with IT department regarding software issues		
C. Troubleshoot hardware / ping network components		
D. Test cat 5 and cat 6 cable		
E. Make and terminate cables		
F. Change batteries on UPSs		

**ADVANCED - OPTIONAL**

<b>Install, Customize, or Upgrade Equipment</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
Prepare and lead the installation, customization, or upgrade team		
Install equipment		
Move/remove equipment		
Customize or upgrade equipment		
Test ensure functionality after installation, move/removal, customization, or upgrade		
Fabricate parts or components		
Modify and update existing documents and procedures pertinent to installation, customization and/or upgrade		
Modify machine specification to meet the needs of the facility within OEM equipment operating limits		
<b>Perform Maintenance Program Continuous Improvement</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
Establish monitoring schedule for equipment/lubricant condition		
Provide maintenance-steps suggestions and schedule for continuous improvements		
Compare new data with original baseline		
Modify specifications as needed to improve maintenance process		
Establish and enter new protocol scheduling as needed		
<b>Install Programmable Logic Controllers</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
Program PLC timers and counters		
Install PLCs and PLC modules		
Maintain PLCs and PLC modules		
Troubleshoot PLCs and PLC modules		
Repair PLCs and PLC modules		
Analyze problems in control system environments using PLC		
Modify, troubleshoot, or manipulate standard operating programs and test/verify them for correct operation		
Integrate hardware and software		
Monitor controls and equipment via remote connection		
<b>Install Real-Time Embedded Microprocessor-Based Data Acquisition and Control Systems</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
Fabricate interface cabling		
Troubleshoot using wiring diagrams, schematics, and test equipment		
Perform diagnosis of equipment malfunctions and effect repairs to restore equipment to required operating condition		
Assist engineering staff with projects pertinent to the maintenance program		
Implement solutions with a combination of Commercial Off-The-Shelf (DOTS) and custom hardware		
Program computer controls for robotics and other equipment		
<b>Perform Equipment Network System Operations, Monitoring and Maintenance (from machine interface up to IDF)</b>		
<b>Competencies</b>	<b>Date Completed</b>	<b>Initial</b>
Operate equipment network system and run system applications		
Perform equipment network system diagnostics		
Monitor and analyze equipment network system performance		

## **RELATED INSTRUCTION OUTLINE**

### **INDUSTRIAL AUTOMATION & MECHATRONICS TECHNICIAN**

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Through consultation with the Apprenticeship Committee and the indenturing employer, apprentices will select an applicable program of study/course track and complete a minimum of 144 hours of related instruction per year of apprenticeship. Courses will be approved by the Apprenticeship Committee and made available to applicable apprentices by approved education providers/institutions. Apprentices will enroll in, and complete, the required coursework that satisfies the minimum requirements of the program. Prior applicable education and training will be credited towards completion of related education requirements and apprentices will be offered tracks advancing their technical aptitude in the profession.

**Source: Norco College**

The following related training outline identifies the courses that are currently identified as suggested course work for this occupation:

#### **BASIC TRAINING:**

Introduction to Automated Warehousing – 90 hours

OSHA Standards for General Industry – 54 hours

Technical Communications – 54 hours

Blueprint Reading – 54 hours

Math for Engineering Technology – 54 hours

CNC Program Writing – 90 hours

Electric Motors for Electricians – 108 hours

#### **ADVANCED OPTIONAL TRAINING:**

Microprocessors and Microcontrollers – 108 hours

Hydraulic and Pneumatic Systems – 108 hours

Industrial Electrical Automation – 108 hours

Programmable Logic Controllers – 90 hours



Appendix A = Work Process Schedule and Related Instruction Outline by LAUNCH Apprenticeship Network, Department of Labor (DOL) – Apprenticeship Building America (ABA) Grant, FoundationCCC is licensed under CC BY 4.0.

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