

**ELECTRONICS TECHNICIAN (Manufacturing Only)
(Time-Based)**

APPENDIX A

O*NET CODE 49-2094.00

This training outline is a minimum standard for Work Processes and Related Instruction. Changes in technology and regulations may result in the need for additional on-the-job or classroom training.

WORK PROCESSES

	Approximate Hours
A. Safety and Health	100
1. Following all safety procedures and policies.	
2. Working safely around machinery.	
3. Properly using all required Personal Protective Equipment (PPE).	
4. Using Lock Out/Tag Out procedure whenever required.	
5. Properly using, storing, disposing of all trade-related hazmats, such as lubricants.	
6. Safely cleaning lead- or asbestos-containing machinery/equipment (if applicable).	
B. Electronics and Workplace Orientation	300
1. Demonstrating an understanding of circuitry basics.	
2. Identifying and using various electrical measuring instruments, including but not limited to: ammeters, ohmmeters, voltmeters, and temperature devices.	
3. Identifying component parts of machines/equipment and production lines (if applicable).	
C. Operating Computers and Programming Software	600
1. Using Numerical Control (NC) and/or Computer Numerical Control (CNC) programs.	
2. Utilizing Computer-Aided Design (CAD) software (if available).	
3. Programming Programmable Logic Controllers (PLCs); De-bugging and troubleshooting PLC software.	
4. Programming lasers (if applicable).	

D. Applying Technical Knowledge

800

1. Accurately reading, interpreting, and drawing schematic diagrams.
2. Accurately reading circuit drawings.
3. Demonstrating knowledge of IPC Code 610 (if applicable).
4. Using statistical process control methods, e.g., Pareto analysis or Ishikawa diagrams to help ensure operational efficiency.
5. Correctly interpreting data and implementing or assisting in implementing changes to workplace processes where necessary.
6. Reading and understanding Bill of Materials (where applicable).

E. Performing Maintenance

1100

1. Developing and implementing preventive maintenance schedules, using computerized systems.
2. Conducting manufacturers' recommended maintenance procedures.
3. Conducting experientially determined maintenance procedures.
4. Cleaning machines and/or equipment.
5. Performing tasks including, but not limited to: lubricating machinery/equipment; adjusting motor speeds; adjusting motor controllers.

F. Troubleshooting

4500

1. Developing familiarity with machinery, equipment, electrical cabinets: components, functions, etc.
2. Communicating effectively with operators/other workers about specifics of problems.
3. Utilizing a combination of skills such as: reading outputs from machinery/equipment internal diagnostics, reading measuring instruments, using sense of vision to identify cause(s) of problem, and to repair all machinery/equipment.
4. Summoning engineer, or other appropriate person, if problem cannot be quickly resolved. Assisting that person in completing repairs.

5. Soldering; acquiring solder certification similar to IPC 7711/21(at option of sponsor). Wave soldering (if applicable).
6. Using tools to perform repairs, e.g., screwdrivers, wrenches, pliers, tweezers, hand drills, rotary tools.
7. Contacting vendors to secure needed parts and/or to obtain technical assistance.
8. Tracking downtime on machinery/equipment; analyzing results; using analysis to improve future operations (if applicable).
9. Welding (if applicable).

G. Miscellaneous (At Option of Sponsor*) 600

1. Operating machinery/equipment.
2. Assisting in installation of new machinery/equipment.
3. Completing reports, checkbox, or narrative, using computer.
4. Performing, or assisting in performing, inventorying tasks.
5. Working on high-voltage manufacturing equipment (208 volts or higher)

Approximate Total Hours 8000

*If optional Work Process is not selected, the hours should be devoted to further mastery of the other required work processes.

Apprenticeship work processes are applicable only to training curricula for apprentices in approved programs. Apprenticeship work processes have no impact on classification determinations under Article 8 or 9 of the Labor Law. For guidance regarding classification for purposes of Article 8 or 9 of the Labor Law, please refer to <https://dol.ny.gov/public-work-and-prevailing-wage>

ELECTRONICS TECHNICIAN

APPENDIX B

RELATED INSTRUCTION

Safety & Health

1. General Workplace Safety
2. Right-to-Know/Material Safety Data Sheets (MSDS)
3. Proper Use of All Trade-Related Personal Protective Equipment (PPE)
4. First Aid & CPR (minimum 6.5 hours every 3 years)
5. Lock-Out/Tag-Out (LOTO)
6. Asbestos Awareness-minimum 4 hours (see attachment) (if apprentice will perform Work Process A.6. on Appendix A)
7. Lead Safety (if apprentice will perform Work Process A.6. on Appendix A)
8. Safety for Welding (if apprentice will perform any welding on-the-job)

Engineering Drawings

1. Interpreting
2. Drawing (if required)
3. Introduction to Computer-Aided Design (CAD) (if apprentice will use on-the-job)

Mathematics

1. Algebra, including linear and quadratic equations
2. Geometry
3. Trigonometry
4. Functions and Graphs
5. Units of Measurement

Trade Theory and Science

1. Technical Physics, including Mechanics
2. Foundations of Electricity
3. Foundations of Electronics
4. Computer Fundamentals

5. Basic Programming and Operating NC or CNC Equipment
6. Introduction to Modern Manufacturing and Production Methods (if applicable)
7. Statistical Process Control
8. Programmable Logic Controllers, including programming of PLCS
9. Welding (if performed on-the-job)
10. Working on High-Voltage Manufacturing Equipment (if apprentice will perform Work Process G.5 on Appendix A)

Other Workplace Skills

1. Interpersonal Communications: oral and written
2. Sexual Harassment Prevention Training – must comply with section 201-g of the Labor Law

A Minimum of 144 Hours of Related Instruction is Required for Each Apprentice for Each Year.

Appendix B topics are approved by New York State Education Department.

ATTACHMENT TO APPENDIX B

Asbestos Awareness

This course must be delivered by one of the following:

1. A provider currently approved by the New York State Department of Health to deliver asbestos safety training.
2. A person holding a current Asbestos Handler certificate from the New York State Department of Labor in the title of: Inspector, Supervisor, Project Monitor, Management Planner, or Project Designer.
3. Anyone otherwise approved by the New York State Education Department.

Minimum course contents must include the following:

1. Definition of asbestos
2. Types and physical characteristics
3. Uses and applications
4. Health effects:
 - a. Asbestos-related diseases
 - b. Risks to families
 - c. Cigarette smoking
 - d. Lack of safe exposure level
5. Employer-specific procedures to follow in case of potential exposure, including making a supervisor or building owner immediately aware of any suspected incidental asbestos disturbance so that proper containment and abatement procedures can be initiated promptly.

Notwithstanding the above course requirement, employers are advised that they must also be in compliance with New York State Department of Labor Industrial Code Rule 56 at all times.

Employers are further advised, and must advise all apprentices, that completion of the above course requirement does not authorize any person to remove, encapsulate, enclose, repair, disturb, or abate in any manner, any friable or non-friable asbestos, asbestos containing material, presumed asbestos containing material, or suspect miscellaneous asbestos containing material.