



STATE OF NEW YORK
DEPARTMENT OF LABOR

APPENDIX A

INSTRUMENT ELECTRICAL MECHANIC
D.O.T. CODE 829.261-018

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

	<u>Approximate Hours</u>
A. <u>Tool and Supply Room</u> Learn size of wire condulets and conduits, simple meters, bending of conduit, use of tools and how to determine the size of the load. Safety.	40
B. <u>Lighting</u> Replacement of incandescent lamps and hot cathode fluorescent bulbs and starters. Repair of fluorescent fixtures, replacing ballast, socket and wiring. Code requirements. Safety.	40
C. <u>Installation AC Wiring</u> Learn installation wiring of machines, wiring contactors, push buttons, principle of overload devices and proper selection. Selection and use of proper fittings for rigid, thin wall and flexible condulets. Bending and installing conduit. Code requirements. Safety.	360
D. <u>Troubleshooting AC Wiring</u> Learn to locate and repair contactor troubles, replacing contacts and contactor coils. Locate and replace blown fuses. Check and repair limit switches, push buttons, etc. Safety.	200
E. <u>Minor AC Motor Repair</u> Learn to disassemble and assemble motors, replacing bearings, cleaning, checking and painting windings. Use of megger.	100
F. <u>Three-Phase Motor Repair</u> Learn to locate and repair grounds, repair and cutting of bad coils. Tapping and reconnecting windings for voltage changes. Safety.	100

<u>Instrument Electrical Mechanic – Continued</u>		<u>Approximate Hours</u>
G.	<u>Special Circuits AC</u> Learning to read wiring diagrams. Operation of special control circuits, time delays switches, electric breaking. Safety.	400
H.	<u>Direct Current Machinery</u> Learn to locate and repair direct current motor and generator troubles in fields, armatures, bearings, brush holders, and commutators. Knowledge of variable speed DC drives, reliance contactors and field control. Truck and battery maintenance, battery chargers, rectifier and motor generator type.	560
I.	<u>General Wiring</u> Learn proper handling and installation or power feeding, wiring, fuse panels, breakers, etc. Estimate load requirements, laying out conduit runs. Code requirements. Install general wiring, wiring fixtures, receptacles, etc. Connecting transformers, three-phase, star and delta connections, transformer polarity, knowledge of generally used wiring systems and current relationship. Three-phase and two-phase, single-phase two and three wire, and three-phase four wire. Safety.	400
J.	<u>Instruments</u> Learn proper use and care of volt meter, ammeter, watt meter, power factor meter and recording meters, etc.	160
K.	<u>Power Factor Correction</u> Learn use of condensers for P.F. correction, use of synchronous motors for P.F. correction. Estimating amount K.V.A.R/ required for proper correction and its effect on power system capacity and power rates. Safety.	160
L.	<u>Industrial Electronics</u> Learn installation, operation and repair of electronic electrifiers. Thymatrol speed control units and public address system. Safety.	400
M.	<u>Types of Instruments or Equipment</u>	960
	1. Recording	
	a. Temperature	
	b. Controllers	
	c. Atmosphere	
	2. Testing	
	a. Sonic	
	b. Thickness Gauges	

Instrument Electrical Mechanic – Continued

3. Control
 - a. Timers
 - b. Temperature
 - c. Valve Control Motors
4. Output
 - a. Amplifiers
 - b. High Frequency Generators
5. Miscellaneous
 - a. Thermocouples
 - b. Potentiometers
 - c. Thermometers

N. Installation Procedures 1160

1. Planning
 - a. Check specifications, blueprints, diagrams, drawing or instructions for job.
 - b. Determine what equipment, material, etc., is necessary for the job.
 - c. Prepare requisitions accordingly.
2. Preparation for Installation
 - a. Determine from blueprints the local of installation
 - b. Make a safety check.
 - c. Prepare layout.
 - d. Check availability of utilities needed, etc.
 - e. Calibrate and adjust equipment.
3. Installation
 - a. Install fasteners
 - b. Set equipment
 - c. Wire or connect, adjust in accordance with instructions or directions.
 - d. Check and test operation.

O. Repair of Instruments 960

1. Check instrument to determine source of trouble.
 - a. Checking circuiting.
 - b. Test tubes, condensers, resistors, etc.
 - c. Check mechanical parts.
2. Remove defective parts, wiring, etc., and replace or repair.
3. Calibrate or otherwise adjust equipment.
4. Check operations.
 - a. Test output, etc.

P. Maintenance of Instruments 700

1. Cleaning and lubrication.
2. Checking standard cells.
3. Installation of charts, changing charts, etc.

Instrument Electrical Mechanic – Continued

P,	Maintenance of Instruments – Continued	
	4. Inking pens, cams, etc.	
	5. Checking humidistats	
Q.	<u>Checking, Testing and Troubleshooting Procedures</u>	300
	1. Check power input	
	2. Check tube	
	3. Check condenser and transformer	
	4. Check wiring	
	5. Check resistor valve	
R.	<u>Construction, Maintenance or Repair of Power Transmission Lines</u>	500
	1. Care and use of tools and equipment:	
	a. pipe cutters	
	b. wrenches	
	c. ladders	
	d. scaffolding	
	e. channel locks	
	f. pipe dies	
	g. pipe benders	
	h. ratchet chain pulls	
	2. Types of lines	
	a. conduit	
	b. duct	
	c. open	
	3. Methods and procedures for construction of power transmission lines	
	a. Locate power transmission lines in accordance with prints or plans	
	b. Fastening, cutting and bending of conduit	
	c. Fastening and cutting of duct	
	d. Fastening and installation of open wiring	
	e. Pulling wires through conduit or duct	
	4. Methods and procedures for construction of other electrical equipment	
	a. Determine from prints or plans location for installation of electrical equipment	
	b. Prepare bases of facilities for fastening	
	c. Install equipment	
	d. Connect power transmission lines	
	5. Safety Precautions	

Total Hours 7500

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 <http://www.labor.state.ny.us/workerprotection/publicwork/PDFs/Article8FAQS.pdf>.

APPENDIX B
INSTRUMENT ELECTRICAL MECHANIC
RELATED INSTRUCTION

Safety

 Fundamentals (4 hours)

 Trade Safety (12 hours)

Blueprint Reading, Sketching and Drawing

 Elementary Blueprint Reading and Sketching

 Blueprint Reading for Electricians

 Electrical Circuit Diagrams

Mathematics

 Fundamentals of Mathematics

 Mathematics of Electricians

First Aid (6.5 hours every 3 years)

Trade Theory

 AC Fundamentals

 DC Fundamentals

 Electrical Measurement

 Circuit Theory

 Industrial Electronics

 National Electric Code (NEC) Requirements

 Local and State Electric Codes

 Other Courses as necessary

Sexual Harassment Prevention Training (3 hours minimum)

A minimum of 144 hours of Related Instruction is required for each Apprentice for each year.