



Appendix A

WORK PROCESS SCHEDULE AND RELATED INSTRUCTION OUTLINE



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WORK PROCESS SCHEDULE

OCCUPATION TITLE: ELECTRICIAN

O*NET-SOC CODE: 47-2111.00

RAPIDS CODE: 0159

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

1. TYPE OF OCCUPATION

Time-based Competency-based Hybrid

2. TERM OF APPRENTICESHIP

The term of the occupation is four () years with an OJL attainment of 8000 hours, supplemented by the minimum required 660 hours of related instruction with a probationary period of 1 year or 2000 OJL hours, whichever is shorter.

3. RATIO OF APPRENTICES TO JOURNEYWORKERS

The apprentice to journeyworker ratio is one (1) apprentice to one (1) journeyworker per job site.

4. APPRENTICE WAGE SCHEDULE

Apprentices shall be paid a progressively increasing schedule of wages based on a percentage of the current hourly journeyworker wage rate, which is: \$13.55 per hour.

PERIODS:

1 st 6 months (1000 hours) = \$9.00	2 nd 6 months (1000 hours) = \$9.65
3 rd 6 months (1000 hours) = \$10.30	4 th 6 months (1000 hours) = \$10.95
5 th 6 months (1000 hours) = \$11.60	6 th 6 months (1000 hours) = \$12.25
7 th 6 months (1000 hours) = \$12.90	8 th 6 months (1000 hours) = \$13.55

5. WORK PROCESS SCHEDULE (See attached Work Process Schedule)

The sponsor may modify the work processes to meet local needs prior to submitting these Standards to the appropriate Registration Agency for approval.

6. RELATED INSTRUCTION OUTLINE (See attached Related Instruction Outline)



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This instruction and experience shall include the following operations, but not necessarily in the listed sequence. Time spent on specific operations need not be continuous.

<u>On-the-Job Learning Processes</u>	<u>Approximate Hours</u>
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1. PRELIMINARY WORK	1000
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- a) Learning the names and uses of the equipment used in the occupation, such as kind, size, and use of cable, wire, boxes, conduits, and fitting, switches, receptacles, service switches, cutouts, etc
- b) Learning names and uses of the various tools use in assembling this material, care of these tools, and other instructions necessary to familiarize the apprentice with the material and tools of the occupation
- c) Safety

2. RESIDENTIAL AND COMMERCIAL ROUGH WIRING	2500
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- a) Assisting in getting the material from stockroom
- b) Loading truck and unloading material and equipment on the job
- c) Laying out the various outlets, switches, receptacles, and other details of the job from blueprints or by direction of the superintendent of construction
- d) Laying out the system with materials to be used, where they are to be placed, and other details as to how they shall be run
- e) Cutting wires, cables, conduit, and raceway; threading and reaming conduit, boring and cutting chases under the direction of the journeyworker
- f) Installing various kinds of wires, cables, and conduits in accordance with requirements
- g) Assisting journeyworker in pulling wires, attaching wires to fish tape, and keeping wires from kinks or abrasions
- h) Connecting conductors to switches, receptacles, or appliances with proper methods of splicing, or soldering, and taping
- i) Installing service switches or load center and sub-feeders and fastening up these parts, running raceways and pulling in conductors under the direction of journeyworker electricians
- j) Assisting in preparing lists of materials used, including names, number of pieces, or number of feet, etc. for office records
- k) Loading unused material and cleaning up job area



3. RESIDENTIAL AND COMMERCIAL FINISH WORK

1500

- a) Connecting and setting switches, receptacles, plates, etc.
- b) Installing proper size and types of fuses for each circuit
- c) Installing and connecting various kinds of fixtures
- d) Tracing the polarity of conductors and devices
- e) Testing the circuit for grounds and shorts and locating and correcting job defects.
- f) Assisting journeyworker in installing and completion of work in accordance with the rules and regulations of the National Board of Fire Underwriters and special local regulations-proper sizes of wires, service, conduits, etc.

4. INDUSTRIAL LIGHTING AND SERVICE INSTALLATION

2000

- a) Installing rigid conduit, metallic electrical tubing, BX armored cable wire molds on all types of heavy electrical equipment and major size service entrance
- b) Wiring all types (gas, oil, stoker, etc.) of heating equipment
- c) Installing wiring and controls for air conditioning
- d) Wiring of specialized systems to include: sound systems, CRT and data systems, telephones, fire alarm systems, fiber optics, energy management systems, nurse call systems, closed circuit TV, street and highway lighting, and signal systems

5. TROUBLESHOOTING

1000

- a) Repairing all kinds of electrical work
- b) Checking out trouble and making repairs under supervision of electrician
- c) Checking out trouble and making repairs without supervision
- d) Motor installation and control 400
- e) Installing over current devices.
- f) Checking for installation and rotation.
- g) Installing replacement motors.
- h) Analyzing motor circuits and troubleshooting.
- i) Installing emergency generators and controls.
- j) Installing pushbuttons, pilot lights, relays, timing devices, and interlocking controls.

TOTAL HOURS

8000

Note: Apprentices may choose either the OJT hours for Industrial and/or Commercial depending upon the specialty of the employing company.



RELATED INSTRUCTION OUTLINE

OCCUPATION TITLE: ELECTRICIAN

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RAPIDS CODE: 0159

Related instruction - This instruction shall include, but not be limited to:

NCCER MODULE#	COURSE MATERIAL / TOPIC	HOURS
26101-11	Orientation to the Electrical Trade	3
26102-11	Electrical Safety	10
26103-11	Introduction to Electrical Circuits	8
26104-11	Electrical Theory	8
26105-11	Introduction to National Electrical Code	28
26106-11	Device Boxes	10
26107-11	Hand Bending	10
26108-11	Raceways and Fittings	30
26109-11	Conductors and Cables	20
26110-11	Basic Electrical Construction Drawings	8
26111-11	Residential Electrical Services	25
26112-11	Electrical Test Equipment	5
TOTAL HOURS YEAR ONE		165

NCCER MODULE#	COURSE MATERIAL / TOPIC	HOURS
26201-11	Alternating Current	10
26202-11	Motor: Theory and Application	20
26203-11	Electric Lighting	25
26204-11	Conduit Bending	15
26205-11	Pull and Junction Boxes	15
26206-11	Conductor Installations	10
26207-11	Cable Tray	10
26208-11	Conductor Terminations and Splices	10
26209-11	Grounding and Bonding	14
26210-11	Circuit Breakers and Fuses	15
26211-03	Control Systems & Fundamental Concepts	21
TOTAL HOURS YEAR TWO		165

NCCER MODULE#	COURSE MATERIAL / TOPIC	HOURS
26301-11	Load Calculations – Branch and Feeder Circuits	17.5
26302-11	Conductor Selection and Calculations	15
26303-11	Practical Applications of Lighting	12.5
26304-11	Hazardous Locations	15
26305-11	Overcurrent Protection	25
26306-11	Distribution Equipment	12.5
26307-11	Transformers	12.5
26308-11	Commercial Electrical Services	20
26309-11	Motor Calculations	12.5
26310-11	Voice, Data and Video	10
26311-11	Motor Controls	12.5
TOTAL HOURS YEAR THREE		165



NCCER MODULE#	COURSE MATERIAL / TOPIC	HOURS
26401-11	Load Calculations Feeder and Services	5
26402-11	Health Care Facilities	10
26403-11	Standby and Emergency Systems	10
26404-11	Basic Electronic Theory	10
26405-11	Fire Alarm Systems	15
26406-11	Specialty Transformers	10
26407-11	Advanced Controls	20
26408-11	HVAC Controls	15
26409-11	Heat Tracing and Freeze Protection	10
26410-11	Motor Operation and Maintenance	10
26411-11	Medium Voltage Termination/Splices	10
26412-11	Special Locations	20
46101-11	Fundamentals of Crew Leadership	20
TOTAL HOURS YEAR FOUR		165
	TOTAL PROGRAM HOURS	660



Specialized Competencies:

The Northside Independent School District Construction Careers Academy will recognize specific competencies for completion of the following core elements within the electrician occupation.

Apprentices must complete the following number of related instructional hour to accompany the required on-the-job learning hours for the award of a specialized competency. The program sponsor will use the on-the-job learning gained through work experience and conduct a performance evaluation to certify acquisition of the skills required for a specialized competency.

Overall apprenticeship completion will be obtained when the apprentices have complete all on-the-job learning and the related theoretical instruction as identified in this work process for the electrician occupation.

ON-THE-JOB LEARNING WORK PROCESS FOR SPECIFIC COMPETENCIES

1. RESIDENTIAL AND COMMERCIAL ROUGH WIRING	2500
2. RESIDENTIAL AND COMMERCIAL FINISH WORK	1500
3. INDUSTRIAL LIGHTING AND SERVICE INSTALLATION	2000

RELATED THEORETICAL INSTRUCTION COURSE MATERIAL / TOPIC

Orientation to the Electrical Trade -----	3
Electrical Safety -----	10
Introduction to Electrical Circuits -----	8
Electrical Theory-----	8
Introduction to National Electrical Code -----	28
Device Boxes-----	10
Hand Bending -----	10
Raceways and Fittings -----	30
Conductors and Cables -----	20
Basic Electrical Construction Drawings -----	8
Residential Electrical Services -----	25
Electrical Test Equipment-----	5
Alternating Current -----	10
Motor: Theory and Application -----	20
Electric Lighting -----	25
Conduit Bending -----	15
Pull and Junction Boxes -----	15
Conductor Installations-----	10
Cable Tray-----	10
Conductor Terminations and Splices -----	10
Grounding and Bonding -----	14
Circuit Breakers and Fuses -----	15
Control Systems & Fundamental Concepts -----	21
TOTAL HOURS -----	330