

Course Code: ELX 114

Course Title: Electrical Formulae, Measurements, and Meters

Department: Applied Sciences and Technologies

Effective Date: Summer 2026

PCS Code: 1.2 - Occupational/Technical Instruction

CIP Code: 46.0302

Repeatability: 0

Credit Hours

Catalog Notation: 0.5-1-1

Credit Hour Distribution:

Lecture: 0.5

Lab: 1

Clinical: 0

Total: 1

General Course Information

Catalog Description

Branch circuit wiring: general lighting circuits, small-appliance circuits, protection devices, and 240-volt circuit design and assembly in both new construction and existing installs and renovations. Circuit analysis in context with load distribution, estimating total loads, and instruments for individual electrical measurements.

General Course Objectives

- Students should be able to demonstrate understanding of power and current considerations for general lighting circuits, small-appliance circuits, protection devices, and 240-volt circuit design and assembly in both new construction and existing installs and renovations.
- Students will be able to perform circuit analysis in context with load distribution, estimating total loads, and safely select and utilize the correct instruments for individual electrical measurements.

Minimum Placement Levels

English	Reading	Math
None	None	Placement out of MAT 060

Prerequisites

Credit in ELX 113

Methods of Evaluation

Students will be given a minimum of 2 quizzes, 2 labs, 1 final exam, and 1 lab practical exam.

Instructional Materials and Additional Supplies

Illustrated Guide to the National Electrical Code, 8th Edition. Charles R. Miller. Cengage Publishing.
978-0357371527

National Electrical Code 2020, 978-1455922970

Safety glasses

Course Content

General Learning Outcomes (GLOs)

- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Load Distribution and Ohm's Law	- Describe how Ohm's law and the power formula are used to help an electrician calculate how to design an electrical system. - Demonstrate ability to perform the math needed to justify the number of circuits needed to handle a given number of anticipated current loads.	2	3	0
Working With Electrical Measuring Devices	- Define, describe, and contrast the safe and proper application of electrical measuring devices such as receptacle testers, digital and analog voltmeters, ammeters and multimeters, non-contact voltage indicators and ammeters, power analyzers, and phase detectors to determine electrical quantities within a circuit. - Demonstrate ability to safely utilize electrical measuring devices to determine electrical quantities within a circuit.	1.5	4	0
New Construction (New Work) Wiring Practices	- Articulate NEC regulations and recommendations regarding the safe installation practices of modern electrical components in new construction, and why these recommendations may have changed over time. - Describe the most significant revisions to service installations, circuit-interruption devices, and other considerations for new construction electrical installations. - Demonstrate the ability to physically construct general and special-purpose branch circuits for new-construction residential and light commercial systems in compliance with the most recent revisions to NEC regulations.	2	4	0
Existing Construction (Old Work) Wiring Practices	- Articulate recommendations regarding the safe installation practices of modern electrical components in existing structures, and how to safely identify and navigate through older construction materials and practices. - Describe how electrical renovation-specific equipment and work practices often differ from that of new construction, and some of the special considerations and hazards that might be present in older structures. - Demonstrate the ability to update or replace general and special-purpose branch circuits for existing residential and light commercial systems in compliance with the most recent revisions to NEC regulations.	2	4	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
7.5	15	0