Course Information Form (CIF)

Course Code: ELX 118

Course Title: Motors, Generators, Industrial Applications, and Troubleshooting

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 46.0302
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 1-2-2
Credit Hour Distribution:

Lecture: 1	Lab: 2	Clinical: 0	**Total: 2**

General Course Information

Catalog Description

Alternating and direct-current motors, their power distribution systems, control mechanisms, and overload/overcurrent protection. Motor troubleshooting tools, techniques, and procedures.

General Course Objectives

Students should be able to describe the nature of direct and alternating current in context with the operation of motors. Students should also be able to describe the differences between various types of AC and DC motors, generators, and alternators and how they function in a circuit. Students should also be able to describe how power distribution systems are designed and constructed and demonstrate the ability to electrically connect and operate motors and control circuits.

Minimum Placement Levels

English	Reading	Math
None	None	Placement out of MAT 060

Prerequisites

Credit in ELX 117

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

Electrical Wiring Residential, 21st Edition. Millin, Simmons & Vigstol. Cengage Publishing. 978-0357766965
Illustrated Guide to the National Electrical Code, 9th Edition. Charles R. Miller. Cengage Publishing. 978-0357766712
National Electrical Code 2020, 978-1455900008
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
Alternating and Direct Current Motor and Generator Theory and Operation	1. Describe the principles of operation of alternating and direct current motors and generators. 2. Define the major components of alternating and direct current motors and generators. 3. Demonstrate the connections and control devices needed for discrete and variable speed control of alternating and direct current motors in industry.	3	6	0
Direct Current Motors and Generators	1. Describe the characteristics and operation of direct current motors and generators and how they are used in industry. 2. Identify and describe direct current motor components, control circuits, and methods used for their speed control. 3. Demonstrate the ability to wire power and control circuits and controllers for DC motor operation.	4	8	0
Alternating Current Motors	1. Describe the characteristics and operation of single and three-phase motors and how they are used in industry. 2. Identify and describe single and three-phase alternating current motor components, control circuits, and methods used for speed control. 3. Demonstrate the ability to wire power and control circuits and variable frequency drives for AC motor operation.	4	8	0
Power Distribution Systems	1. Describe how localized power distribution systems are designed and describe their major components. 2. Describe the different stages of power systems (generation, transmission, subtransmission, distribution, secondary) and their associated voltages. 3. Demonstrate the safe installation of components in power distribution panels, motor control centers, and lighting panels.	4	8	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
15	30	0