

Course Code: ECJ 211

Course Title: IBEW Electrical Construction Journeyman VII

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: 2-2-3

Credit Hour Distribution:

Lecture: 2

Lab: 2

Clinical: 0

Total: 3

General Course Information

Catalog Description

Part of IBEW Apprenticeship Program: motor constructions, motor installations, protection, controls, and schematic diagrams.

General Course Objectives

Motor constructions, motor installations, protection, controls, and schematic diagrams.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Credit in ECJ 119

Admission into the IBEW Apprenticeship School

Methods of Evaluation

The minimum evaluation tools to be used are: 4 written tests, 4 quizzes, 25 homework lessons, attendance at 18 class sessions, and 4 lab exercises.

Instructional Materials and Additional Supplies

Transformers and Motors: A Single-Source Reference for Electricians, George Shultz. 9780750699488

Electronics: Principles and Applications, 9th Edition, Charles Schuler. 9780073373836

Industrial Motor Control, 10th Edition, Stephen Herman. 9781133702818

Code Calculations Textbook, by NJATC

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.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Lightning Protection Systems, Optoelectronics, and Fiber Optics	- Describe lightning protection, optoelectronics, and fiber optics. - Demonstrate installation of lightning protection systems and fiber optics.	5	5	0
Introduction to Motors: construction and nameplate specifications, AC fractional HP motors, repulsion, universal and DC motors, poly-phase motors, motor installations	- Calculate the motor usage from nameplate specifications. - Describe motor types and demonstrate correct connection procedures. - Install a motor with protection to the individual and equipment using the NEC.	5	5	0
Motor Control: motor starters and magnetic controls, over current and phase failure relays, push buttons, selector switches, and magnetic pilot devices	- Determine the type and size of the starter by amperage load of the motor. - Determine the proper control device for a motor in a given application.	5	5	0
Jogging Circuits: jogging a reversing circuit, schematic drawings II, hand-off-auto with start-stop control, wiring diagrams II	- Read motor control drawings and wiring diagrams. - Mechanically interlock motors. - Describe and demonstrate the connection of jogging a reversing circuit.	5	5	0
DC Motors and Controls: solid state DC motor controls, AC motors, AC motor starters	- Describe and define different DC and AC motors, their characteristics, and their operating modes. - Demonstrate proper connection methods.	5	5	0
Stepping Motors, Wound Rotor Motors, Synchronous Motor Controls, Clutches and Drives, Motor Control Applications	- Describe and define stepping, wound rotor, and synchronous motor controls. - Describe and define clutches and drives and discuss motor control applications. - Demonstrate proper connection methods of different motor types, clutches, belts, chains, or direct drive motors. - Describe fractional HP motors and their applications.	5	5	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	30	0