

Course Code: ECJ 114

Course Title: IBEW Electrical Construction Journeyman IV

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: 3-2-4

Credit Hour Distribution:

Lecture: 3

Lab: 2

Clinical: 0

Total: 4

General Course Information

Catalog Description

Part of IBEW Apprenticeship Program: inductance and capacitance in AC circuits, National Electrical Code (NEC) standards relating to transformers, transformer theory, design, and calculation, and wiring methods and devices.

General Course Objectives

Gain experience and knowledge regarding inductance and capacitance in AC circuits, National Electrical Code (NEC) standards relating to transformers, transformer theory, design, calculations, and wiring methods and devices.

Minimum Placement Levels

English	Reading	Math
None	None	None

Prerequisites

Credit in ECJ 113

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

Cables and Wiring, 2nd Edition, by John Cadick 9780766802704

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
Inductance and Inductive Reactance, Series and Parallel Inductors, Mutual Inductance, Capacitance, RC Time Constants, Capacitive Reactance vs. Frequency vs. Capacitance, Capacitors in Series/Parallel, AC Circuit Characteristics	- Solve for total inductance and capacitance in series, parallel, and combination circuits. - Determine reactance of circuits containing both inductors and capacitors. - Describe and demonstrate the effect of inductive reactance and capacitive reactance on AC circuits.	9	6	0
Vectors, Series/Parallel RL Circuits	Calculate power factor in an AC circuit.	9	6	0
Combination LCR Circuits, Scope Analysis of LCR Circuits	Demonstrate the effects of combination LCR circuits through scope analysis.	9	6	0
Transformers, Single Phase and Buck-boost Calculations and Connections, Three-phase Transformer Calculations and Connections Delta-Delta, Delta-Wye Three-phase Buck-boost Transformers	- Describe the fundamental design and function of transformers. - Identify and make single phase transformer connections. - Describe step-up and step-down transformers and primary and secondary windings. - Identify and make three-phase transformer connections.	9	6	0
Sizing Building Wire; Calculating Conductor Ampacity; Branch Circuits; Outside Branch and Feeder Circuits, Services, Lighting, and Receptacles	- Identify proper devices and proper use of these devices for a particular job. - Determine branch circuits requirements by the NEC. - Determine building services requirements by the NEC.	9	6	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
45	30	0