

Syllabus

Year One

TOPICS: Direct-Current Fundamentals & Residential Wiring

CONTACT HOURS: 164.50

PREREQUISITES: None

INSTRUCTOR NAME:

INSTRUCTOR CONTACT INFORMATION:

START DATE:

END DATE:

Description: The first year introduces apprentices to the principles associated with electricity and electrical theory pertaining to direct current. These basic fundamentals are necessary in understanding complex *National Electrical Code* requirements covered throughout the program. In the latter part of the year, students will begin utilizing the *National Electrical Code* and learn proper installation methods commonly used in residential wiring.

Upon successful completion, students should be able to;

- Identify hazards associated with electricity and in the construction field
- Explain the proper PPE required for specific applications
- Discuss methods of minimizing or eliminating the potential for hazards when working around electricity
- Understand the components of matter and their electrical properties
- Analyze basic electrical circuits (Series, Parallel, and Series-Parallel)
- Calculate unknown values using Ohm's Law
- Explain the purpose of the *National Electrical Code* and its arrangement
- Understand terms as used in the *National Electrical Code*
- Lay out electrical equipment in accordance with required working space
- Demonstrate proficiency referencing *Code* articles in the general requirements
- List locations requiring ground-fault and arc-fault protection
- Determine required locations of receptacle and lighting outlets in dwelling units
- List types of overcurrent protection and their standard ratings
- Properly size equipment grounding and grounding electrode conductors

Textbooks

Basic Electrical Theory. 2nd. Leesburg: Mike Holt Enterprises, Inc,
ISBN 1-932685-12-X, 2007

Understanding the NEC Volume 1. Leesburg: Mike Holt Enterprises, Inc,
ISBN 978-1-932685-33-6, 2008

Understanding the NEC Volume 1 Workbook. Leesburg: Mike Holt Enterprises, Inc,
ISBN 978-1-932685-45-9, 2008

National Electrical Code 2008. Batterymarch Park: National Fire Protection Association,
ISBN 978-087765790-3, 2007

Print Reading Based On the 2008 NEC. 2008. Homewood: American Technical
Publishers, Inc, ISBN 978-08269-1567-2, 2008 R.T. Miller

Teaching Strategies

Teaching strategies could include lecture, board work, demonstration, lab activity, classroom exercises, discussion, practice questions, examination, reading assignments, field trips, guest lectures, group projects, and presentations.

Topical Outline

- OSHA 10 hr Safety Training
 - Introduction to OSHA
 - Electrical Safety
 - Fall Protection
 - Excavations
 - Cranes
 - Materials, Handling, Use, and Disposal
 - Tools – Hand & Power
 - (PPE) Personal Protective Equipment
 - Scaffolds
 - Stairways & Ladders
- Matter
 - Atomic Theory
 - Law of Charges
 - Electrical
 - Atomic
 - Static Charge
 - Lightning and Protection
- Electron Theory
 - Electron Orbit
 - Valence
 - Valence Electrons
 - Conductors
 - Insulators
 - Semiconductors
 - Atomic Bonding
 - Compounds
- Magnetism
 - Natural Magnet
 - Polarities
 - Compass
 - Magnetic Molecule
 - Properties
 - Retentivity
 - Permeability
- Electricity
 - Current Flow
 - Useful Purposes

- Dangers of Electricity
- *National Electrical Code*
- Electromagnetism
 - In a Wire
 - Field Intensity
 - Field Interaction
 - Loops
 - Electromagnetism in a Coil
 - Magnetic Core
 - Ampere and Turns
- Uses of Electromagnetism
 - Basic Electric Meters
 - Electric Motors
 - Electric Generators
 - Electromagnetic Relays
- The Electric Circuit
 - Electron Current Flow Theory
 - Conventional Current Flow Theory
 - Voltage
 - Resistance
 - Current
 - Power
 - Electrical Formulas
- Math
 - Whole Numbers
 - Decimals
 - Fractions
 - Percentages
 - Multipliers
 - Percent Increase
 - Reciprocals
 - Squaring a Number
 - Square Root
 - Volume
 - Kilo
 - Rounding Off
 - Parentheses
 - Testing your Answer
- Electrical Formulas
 - Conductance
 - Resistance
 - Ohm's Law
 - Power Losses
 - Cost of Power
- Series Circuits
 - Practical Uses

- Calculations
- Circuit Notes
- Variations
- Power Supplies
- Parallel Circuits
 - Practical Uses
 - Calculations
 - Circuit Notes
 - Power Supplies
- Series-Parallel Circuits
 - Review
 - Working with Series-Parallel Circuits
 - Voltage
- Multiwire Circuits
 - Neutral Conductor
 - Grounded Conductor
 - Current Flow (Grounded Conductor)
 - Balanced Systems
 - Unbalanced Current
 - Multiwire Branch Circuits
 - Dangers
 - *NEC* Requirements
- How to Use the *NEC*
- *NEC* General Introduction
- Definitions
- Requirements for Electrical Installations
- Grounded Conductors
- Branch Circuits
- Feeders
- Service Calculations
- Outside Wiring
- Services
- Overcurrent Protection
- Print-Reading
- One-Family Dwellings
- Device Wiring
- Terminations
- Switching Circuits
- Circuit Layout
- Installation
- CPR

Assessment

Methods of assessment may include projects, quizzes, exams, in or out of class activities, and class participation

Item	% of Grade
Participation	10%
Projects & Assignments	10%
Quizzes	20%
Exams	30%
Labs	30%
Total	100%

Sample