APEL 120: ORIENTATION TO THE ELECTRICAL TRADE

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	4
Hours:	24 lecture, 72 laboratory per quarter (96 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Electrical Apprenticeship Program; student is a registered State indentured apprentice.
Advisory:	Not open to students with credit in APRT 120.
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Non-GE
Transferable:	None
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- A student will be able to apply electrical theory for basic units.
- A student will be able to apply electrical theory for series circuits.
- A student will be able to demonstrate jobsite Safety and OSHA Regulation.
- A student will be able to explain and use OHMS Law.

Description

Orientation to the commercial/industrial electrical industry with an introduction to electrical theory, tools, materials, wiring methods, and job skills. Review of mathematics as applied in the electrical construction trades.

Course Objectives

The student will be able to:

1. Apply an understanding of basic electricity and Ohm's Law through series circuits and an orientation to the electrical industry
2. Demonstrate basic on-the-job skills to include communication skills, use of tools and materials, and on-the-job safety
3. Review basic math skills
4. Demonstrate an understanding of electrical theory
5. Demonstrate the proper use and care of tools and equipment
6. Identify job site safety guidelines and procedures

Course Content

1. Orientation to electrical trades industry
    a. Job site chain of command: owner/customer, architects and engineers, inspection authorities, general and specialty contractors
    b. Organizations within the industry: manufacturers, distributors, trade unions
2. Methods of working with others
    a. Three basic methods of motivation
    b. Human levels of need
    c. Leadership style and the role of competent supervisors
    d. Effective workplace communication: importance, barriers, and keys
3. Mathematics
    a. Review arithmetic properties
    b. Word problems
    c. Fractions
    d. Decimals
    e. Properties of triangles
    f. Metric system
    g. Prefixes
    h. Conversion from English to metric
    i. Powers of ten
    j. Algebraic formulas
    k. Square roots
    l. Ratio, percentage, and proportion
    m. Direct and inverse relationships
4. Basic electrical theory
    a. Define terms
    b. Electron flow
    c. Producing electrical current
    d. Effects of electrical current
5. Tools, materials, safety, and handling
    a. Proper tool management
    b. Identify common hand and power tools
    c. Proper selection and application
    d. Proper care of tools
    e. Tool defects that create unsafe conditions
    f. Ladder safety
    g. Proper rigging methods
    h. Knots
    i. Techniques for rigging and hoisting
    j. Safe capacities for lifting arrangements
    k. Digging techniques
    l. Depth and shape of holes for supporting poles
    m. Digging, grading, and leveling trenches for installation of ducts
    n. Motorized tools
    o. Platform lifts
    p. Bucket trucks
    q. Truck mounted cranes
    r. Material management
    s. Identify commonly used materials by name
    t. Proper selection and application of materials
6. General job site safety and awareness
    a. Why safety is important
    b. Key factors involved with safe work practices
    c. Develop respect for electricity
    d. Be aware of dangers

e. Describe locations of potential hazards
f. Demonstrate use of no contact voltage indicators and other devices to determine if system is energized
g. Demonstrate safe techniques for energized systems
h. Hazards from poor job site house keeping
i. Awareness of dangers of fall objects and respect for job safety rules

Lab Content

1. Students will demonstrate the proper use of power tools
2. Students will demonstrate proper pipe bending techniques
3. Students will properly install and wire single pole switches

Special Facilities and/or Equipment

1. Laboratory with electrical tools and equipment.
2. When taught via Foothill Global Access, on-going access to computer with software and hardware capable of running video conferencing applications (e.g., Zoom).

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

Results of written quizzes and average of six tests
Results of hands-on projects and homework
Results of class participation
Maintenance of a student's workbook with questions drawn from text

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Lab assignments
Group discussion
Class demonstrations

Representative Text(s) and Other Materials

Hart, G.V., and S. Hart. Ugly's Electrical References. 2020.

Callanan, M.I., and B. Wusinich. Electrical Systems. 2020.

National Joint Apprenticeship and Training Committee. Syllabus for First Year Core Curriculum. 2022.

National Joint Apprenticeship and Training Committee. Code & Practices-1 Student Workbook. 2020.

National Joint Apprenticeship and Training Committee. Conduit Fabrication Student Workbook. 2007.

National Joint Apprenticeship and Training Committee. Conduit Lab Manual. 2011.

National Joint Apprenticeship and Training Committee. DC Theory Student Workbook. 2010.

National Joint Apprenticeship and Training Committee. Inside Job Information 1-Student Workbook. 2005.

National Joint Apprenticeship and Training Committee. Orientation Student Workbook. 2005.

National Joint Apprenticeship and Training Committee. DC Theory. 2010.

NFPA. National Electrical Code (NEC). 2020.

These are the standard electrical textbooks/workbooks used for this course. Although some may be older than 5 years, they are the most current books used when teaching this course.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Read chapter on Codes & Practices-1 in the National Joint Apprenticeship and Training Committee (NJATC) for the Electrical Industry Student Workbook
2. Read chapter 5 on Conduit Fabrication in the National Joint Apprenticeship and Training Committee (NJATC) for the Electrical Industry Student Workbook
3. Write article on important safety considerations per the National Fire Protection Association, NEC. NFPA 70: National Electrical Code

Discipline(s)

Electricity