

APEL 136: RESIDENTIAL ELECTRICAL D/C THEORY; BLUEPRINT READING

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2023
Units:	3
Hours:	24 lecture, 51 laboratory per quarter (75 total per quarter)
Prerequisite:	Per California Code of Regulations, this course is limited to students admitted to the Electrical Apprenticeship Program.
Advisory:	Not open to student with credit in APRT 136.
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 successful student will be able to demonstrate the use of Ohms Law in a DC circuit.
- A successful student will be able to properly identify electrical symbols on a blueprint.

Description

Introduction to D/C electrical theory and circuitry as it relates to residential installations; conductors used in electrical wiring. Also introduces blueprint reading, including architectural and engineering symbols and scale.

Course Objectives

The student will be able to:

1. Calculate values using Ohm's Law in D/C series, parallel, and combination circuits
2. Explain the differences and sizing of conductors used in D/C electric circuits
3. Identify architectural and mechanical symbols on residential drawings

Course Content

1. Ohm's Law & D/C theory
 - a. Series, parallel, and combination circuits
 - b. Current
 - c. Voltage
 - d. Power
 - e. Ohm's Law
2. Differences of conductors
 - a. Copper sizing
 - b. Insulation properties
 - c. Aluminum sizing

3. Architectural and mechanical symbols
 - a. Plans and scales
 - b. Elevations and details
 - c. Section views
 - d. Ratios and proportions

Lab Content

Students will work individually and in teams on proper wiring and grounding of electrical systems. Safe working practices for on-the-job training include:

1. Equipment safety
2. Fire protection
3. Electrostatic discharge (ESD)
4. Safe handling practices

Special Facilities and/or Equipment

Laboratory with electrical tools and equipment.

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
 Demonstration

Representative Text(s) and Other Materials

Callanan, Michael, and Bill Wusinich. Electrical Systems Based on the 2020 NEC. 2020.

Electrical Training ALLIANCE. Applied Codeology Navigating the 2020 NEC. 2020.

Klein, Stan, and Jim Paladino. DC Theory. 2009.

National Fire Protection Association. National Electrical Code. 2019.

NJATC. Blueprint Reading for Electricians, 3rd ed.. 2010.

NJATC. Building a Foundation in Mathematics, 2nd ed.. 2010.

Although some of these texts are older than the suggested "5 years or newer" standard, they remain seminal texts in this area of study.

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

1. Weekly reading assignments from text and outside sources
2. Weekly lecture covering subject matter from text assignment with extended topic information
3. Weekly lab exercises. Each lab exercise may include individual or group participation

Discipline(s)

Electricity