

# APEL 137: RESIDENTIAL ELECTRICAL A/C THEORY & CIRCUITRY

## Foothill College Course Outline of Record

Heading	Value
<b>Units:</b>	3
<b>Hours:</b>	24 lecture, 51 laboratory per quarter (75 total per quarter)
<b>Prerequisite:</b>	Per California Code of Regulations, this course is limited to students admitted to the Electrical Apprenticeship Program.
<b>Advisory:</b>	Not open to students with credit in APRT 137.
<b>Degree &amp; Credit Status:</b>	Degree-Applicable Credit Course
<b>Foothill GE:</b>	Non-GE
<b>Transferable:</b>	None
<b>Grade Type:</b>	Letter Grade (Request for Pass/No Pass)
<b>Repeatability:</b>	Not Repeatable

## Student Learning Outcomes

- A successful student will be able to demonstrate the use of Ohms Law in an AC circuit.
- A successful student will be able to properly makeup a circuit with a light, switch and a duplex receptacle.

## Description

Introduction to A/C electrical theory and circuitry as they relate to residential installations; job costing and industrial standards. Further study of the National Electrical Code focusing on codeology. Expanded development of blueprint reading skills.

## Course Objectives

The student will be able to:

- Expand skills of reading and analyzing blueprints.
- Explain job costing and industrial standards.
- Identify the National Electrical Code's key words and use the code's clues.
- Discuss series and parallel circuits and apply Ohm's Law.

## Course Content

- Residential blueprint reading
  - Blueprint review
  - Analyzing residential blueprints
- Job costing and industrial standards
  - Actual job takeoffs
  - Communications
  - Labor management relations
  - Parliamentary procedures
- National Electrical Code
  - Understanding the language of the code
  - Identifying key words

- Using the code's clues
- A/C electrical theory
  - Series circuits
  - Parallel circuits
  - Current
  - Voltage
  - Ohm's Law

## 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:

- Equipment safety
- Fire protection
- Electrostatic Discharge (ESD)
- Safe handling practices

## Special Facilities and/or Equipment

Laboratory with electrical tools and equipment.

## Method(s) of Evaluation

- 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

- Lecture
- Lab Assignments
- Group Discussion
- Demonstration

## Representative Text(s) and Other Materials

Klein, Stan, and John McCord. AC Theory. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee for the Electrical Industry, 2009.

Mullin, Ray. Electrical Wiring Residential. Albany, NY: Delmar/Thompson Learning, 2009.

National Joint Apprenticeship and Training Committee for the Electrical Industry. Mathematics Essential for NJATC Courses. 2nd ed. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee for the Electrical Industry, 2012.

National Fire Protection Association. National Electrical Code. Quincy, MA: National Fire Protection Association Inc., 2014.

National Joint Apprenticeship and Training Committee for the Electrical Industry. Applied Codeology. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee for the Electrical Industry, 2009.

National Joint Apprenticeship and Training Committee for the Electrical Industry. Conduit Bending and Fabrication. Upper Marlboro, MD: National Joint Apprenticeship and Training Committee for the Electrical Industry, 2009.

Although one or more of these texts may be older than the suggested "5 years or newer" standard, it remains a seminal text in this area of study.

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

A. Reading Assignments: Weekly reading assignments from text and outside sources.

B. Lecture: Weekly lecture covering subject matter from text assignment with extended topic information.

C. Laboratory Exercises and Demonstrations: Weekly lab exercises. Each lab exercise may include individual or group participation.

## **Discipline(s)**

Electricity