APEL 112: RESIDENTIAL ELECTRICAL AIR CONDITIONING & REFRIGERATION; TELEPHONE SYSTEMS

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 students with credit in APRT 112.
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 demonstrate the proper procedure to test for power in an air condition system.
- A student will be able to identify the parts in a Telephone system.

Description

An introduction to air conditioning and refrigeration systems used in residential applications; telephone systems. Students study the wiring, circuitry, and controls in these systems. Continued study of the National Electrical Code as it relates to current and load calculations. Review of A/C and D/C theory.

Course Objectives

The student will be able to:

a. Discuss the fundamentals of air conditioning and refrigeration systems
b. Describe and evaluate various telephone and paging systems
c. Demonstrate proficiency in troubleshooting air conditioning and refrigeration systems
d. Demonstrate proficiency troubleshooting telephone systems
e. Use the National Electrical Code to calculate currents and loads in residential applications

Course Content

a. Air conditioning and refrigeration systems
    i. Fundamentals
    ii. Controls
b. Telephone and paging systems
    i. Series and parallel RL, RC, and RLC circuits
    ii. Grounding
c. Air conditioning and refrigeration systems
    i. Troubleshooting systems to component level
    ii. Preventative maintenance
d. Telephone systems
    i. Analog systems
    ii. Digital systems
    iii. Paging systems
e. National Electric Code
    i. Over currents
    ii. Fault currents
    iii. Calculating loads

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:

a. Equipment safety
b. Fire protection
c. Electrostatic discharge (ESD)
d. 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

American Technical Publishers. Motors. 2010.

American Technical Publishers. Transformer Principles and Applications. 2012.

Dunlop, James. Photovoltaic Systems. 2012.

National Fire Protection Association. National Electrical Code. 2019.

National Joint Apprenticeship and Training Committee for the Electrical Industry. Conduit Bending and Fabrication. 2009.

Simmons, Phil, and Ray Mullin. Electrical Wiring Residential, 20th ed.. 2020.

Although one or more of these texts is 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. Weekly reading assignments from text and outside sources

Discipline(s)

Electricity