

APEL 121: ELECTRON THEORY; BASIC BLUEPRINT READING; DC THEORY; NATIONAL ELECTRICAL CODE INTRODUCTION

Foothill College Course Outline of Record

| Heading | Value |
|-------------------------|---|
| Effective Term: | Summer 2021 |
| 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. |
| Advisory: | Not open to students with credit in APRT 121. |
| 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 use a Pipe Bender to bend a conduit.
- A successful student will be able to apply DC theory to electrical circuits.
- A student will be able to apply electrical theory to parallel circuits.
- A student will be able to explain direct and alternating current.

Description

Introduction to the National Electrical Code (NEC), DC theory, principles of magnetism and electromagnetism, basic blueprint reading.

Course Objectives

The student will be able to:

- Explain and demonstrate DC theory, magnetism and electromagnetism.
- Explain and demonstrate Ohm's Law; series, parallel and combination circuits.
- Utilize symbols used in electrical and related trades.
- Demonstrate the fundamentals of blueprint reading.

Course Content

- Knowledge of electrical theory
 - Magnetic and electromagnetic theory
 - Understand electron flow theory
- Knowledge of Ohm's Law
 - Identify parts and types of an electric circuit

- Properly use Ohm's Law to calculate resistance, voltage current and power
- Symbols used in blueprints
 - Electric symbols
 - Architecture symbols
- Fundamental understanding of blueprints
 - Identify different types of blueprints
 - Understand the function of different line types
- National Electric Code requirements
 - National electrical and local codes
 - Purpose and intent of electrical codes
 - Scope on NEC and local codes
 - How local codes may differ from other local codes

Lab Content

- Student will demonstrate the proper use of power and hand tools
- Student will properly measure voltage, resistance and current
- Student will demonstrate the proper use of meters

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
- Group discussion
- Class demonstration
- Lab assignment

Representative Text(s) and Other Materials

Hart, G.V., and S. Hart. [Ugly's Electrical References](#). 2012.

Callanan, M. I., and B. Wusinich. [Electrical Systems](#). 2011.

National Joint Apprenticeship and Training Committee. [Syllabus for First Year Core Curriculum](#). 2013.

National Joint Apprenticeship and Training Committee. [Code & Practices-1 Student Workbook](#). 2011.

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](#). 2008.

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, 3rd ed.. 2010.

NFPA. National Electrical Code (NEC). 2011.

These are the standard electrical textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

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

- A. Read chapter 1-4 on Electrical Systems in the National Joint Apprenticeship and Training Committee (NJATC) for the Electrical Industry Student Workbook.
- B. Read chapter 1 on Organizing in the Union in the National Joint Apprenticeship and Training Committee (NJATC) Student Orientation Workbook.
- C. Prepare an electrical diagram using the principles of Ohm's Law.
- D. Complete worksheet showing electrical symbols used in blueprints.

Discipline(s)

Electricity