

APED 220.4 Course Outline as of Fall 2022**CATALOG INFORMATION**

Dept and Nbr: APED 220.4 Title: APP ELECTRICIANS 4TH SEM

Full Title: Apprentice Electricians, Fourth Semester

Last Reviewed: 3/28/2022

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	4.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	4.00	Lab Scheduled	0	4	Lab Scheduled	0
		Contact DHR	3.00		Contact DHR	52.50
		Contact Total	6.00		Contact Total	105.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 210.00

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: APED 260D

Catalog Description:

Students will be introduced to training related to electrician indentured apprenticeship. This is the fourth semester of a ten-semester program.

Prerequisites/Corequisites:**Recommended Preparation:**

Course Completion of APED 220.3

Limits on Enrollment:

Indentured apprentice - apply and be accepted by the Redwood Empire Joint Apprenticeship & Training Committee (REJATC)

Schedule of Classes Information:

Description: Students will be introduced to training related to electrician indentured apprenticeship. This is the fourth semester of a ten-semester program. (Grade Only)

Prerequisites/Corequisites:

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Transfer Credit:

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:
IGETC:	Transfer Area	Effective:	Inactive:
CSU Transfer:		Effective:	Inactive:
UC Transfer:		Effective:	Inactive:

CID:

Certificate/Major Applicable:

Certificate Applicable Course

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Describe and demonstrate electrical principles and regulations related to electricians' trade.
2. Apply best practices in practical environment related to electricians' trade.

Objectives:

At the conclusion of this course, the student should be able to:

1. Describe and demonstrate conduit fabrication techniques.
2. Identify and demonstrate an ability to work with inductor and capacitor (LC) and combination resistor, inductor, and capacitor (RLC) circuits.
3. Describe and demonstrate an understanding of basic key principles and functions of transformers.
4. Describe and demonstrate a working knowledge of advanced key principles of Alternating Current (AC) theory and test instruments.
5. Describe and demonstrate a working knowledge of and ability to perform electrical code calculations.
6. Explain the general principles and basic function of conduit, raceway, cable assemblies, and wiring.
7. Explain the function of metal and non-metallic tubing and conduit.

Topics and Scope:

- I. Conduit Fabrication, Level II
 - A. Conduit threading techniques
 - B. Push-through bending: 90° bends
 - C. Bending kicks, offsets and saddles using the push-through method
 - D. Segmented bends
- II. AC Theory, Level II
 - A. Identifying and working with LC circuits
 - B. Analyzing and working with combination RLC circuits

III. Transformers, Level I

- A. Magnetism and electromagnetism
- B. Transformers operation principles
- C. Transformer connections
- D. Real world transformer connections
- E. Harmonics
- F. Power generation and distribution

IV. AC Theory, Level III

- A. Power factor
- B. Power factor correction
- C. General use test instruments
- D. Electronic circuit test instruments
- E. Introduction to generators
- F. Understanding how the DC generator works
- G. Understanding the design and function of AC generators
- H. An introduction to 3-phase systems

V. Electrical Code Calculations, Level I, Based on the Current National Electrical Code (NEC)

- A. Beginning to calculate conductor ampacity
- B. Determining conductor ampacity
- C. Finalizing ampacity calculations
- D. Identifying boxes and fittings as defined by the NEC
- E. Performing box size and fill calculations
- F. Calculating raceway fill

VI. Code, Standards, and Practices 2, Level II, Based on the Current NEC

- A. Conduit and raceway basics
- B. NEC requirements for cable assemblies
- C. General requirements for wiring methods and materials
- D. Conductors for general wiring
- E. Electrical Nonmetallic Tubing (ENT)
- F. Liquidtight Flexible Metal Conduit (LFMC) and Liquidtight Flexible Non-Metallic Conduit (LFNC)

All topics are covered in the lecture and lab portions of the course.

Assignment:

Lecture-Related Assignments:

1. Homework assignments (1 - 2 sets per week)
2. Quizzes and examinations (4 - 6 per semester)
3. Hands-on Craft Certification skills exam (students must pass in order to complete the course)
4. Written final exam (students must pass in order to complete the course)

Lab-Related Assignments:

1. Class performances and field work (on-the-job demonstrations) of skill development, safety practices, equipment, and material handling

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing
0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Homework assignments; field work

Problem solving
5 - 10%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances; field work

Skill Demonstrations
40 - 45%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes and examinations, Craft Certification skills exam, final exam

Exams
40 - 45%

Other: Includes any assessment tools that do not logically fit into the above categories.

Attendance and participation

Other Category
5 - 10%

Representative Textbooks and Materials:

Conduit Bending and Fabrication Textbook (S495) Catalog Order No: S495 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2007 (classic)

Conduit Bending and Fabrication Lab Manual Catalog Order No: J204L in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2007 (classic)

Building a Foundation in Mathematics Textbook Catalog Order No: S665 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2010 (classic)

AC Theory Textbook, 3rd Edition Catalog Order No: S641 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2011 (classic)

Test Instruments and Applications Textbook, 2nd edition Catalog Order No: S571 in the Electrical Training Alliance 2020 Training Essentials Catalog. American Technical Publishers. 2018

Transformers Principles and Applications Textbook Catalog Order No: S476 in the Electrical Training Alliance 2020 Training Essentials Catalog. American Technical Publishers. 2006 (classic)

National Fire Protection Association 70 National Electrical Code - 2020 Handbook Catalog Order No: S1050 in the Electrical Training Alliance 2020 Training Essentials Catalog. Delmar Cengage Learning. 2020

Code Calculations Textbook Catalog Order No: S00817 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2017

Electrical Systems Based on the 2020 NEC Textbook Catalog Order No: S1070 in the Electrical Training Alliance 2020 Training Essentials Catalog. American Technical Publishers. 2020