

APED 220.8 Course Outline as of Fall 2022**CATALOG INFORMATION**

Dept and Nbr: APED 220.8 Title: APP ELECTRICIANS 8TH SEM

Full Title: Apprentice Electricians, Eighth 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 260H

Catalog Description:

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

Prerequisites/Corequisites:**Recommended Preparation:**

Course Completion of APED 220.7

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 eighth 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 knowledge of the types of motor control devices, their components and function, applications, and control diagrams and drawings.
2. Demonstrate understanding of code, standards, and practices relative to electrical equipment and special equipment.
3. Describe and demonstrate working knowledge of digital electronics, Boolean algebra and gates, amplifiers, and debouncing circuits.
4. Describe the principles and function of different types of Programmable Logic Controllers (PLCs).
5. Describe and demonstrate working knowledge of PLC installation, setup, and maintenance.

Topics and Scope:

- I. Motor Control, Level I
 - A. Introduction to magnetic motor control
 - B. Manual pilot devices
 - C. Automatic pilot devices
 - D. Magnetic control relays
 - E. Control transformers
 - F. Magnetic contactors
 - G. Basic motor starters
 - H. Basic timers
 - I. Control diagrams and drawings
- II. Motor Control, Level II

- A. Basic electronics for motor control devices
 - B. More electronics for motor control devices
 - C. Solid-state motor control pilot devices
 - D. Solid-state relays
 - E. Motor control centers
 - F. Special purpose starters
 - G. Electronic programmable timers
 - H. Special control components
 - I. AC motor speed control
- III. Code, Standards, and Practices 4, Based on the Current NEC
- A. Electrical equipment
 - B. Special equipment
 - C. Introduction to cable tray systems
 - D. Installing surface metal raceways
- IV. Digital Electronics, Level I
- A. Introduction to digital electronics
 - B. Introduction to Boolean algebra
 - C. Logic gates: AND, Not AND (NAND), OR, Negated OR gate (NOR), Exclusive OR (XOR), and Exclusive Negated OR gate (XNOR)
 - D. Buffer and inverter amplifiers
 - E. Debouncing circuits
- V. Introduction to Programmable Logic Controllers (PLC)
- A. Electrical safety and principles
 - B. Electrical circuits and hardware
 - C. Programming instructions, timers, and counters
 - D. System interfacing
 - E. Installations, startup, and system maintenance
 - F. Troubleshooting principles and test instruments
 - G. Troubleshooting hardware and software
 - H. Analog principles, analog device installation, and PLC programming

Assignment:

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)
5. 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:

Fundamentals of Motor Control Catalog Order No: S547 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2012 (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

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

Intro to Programmable Logic Controllers 2nd Edition Textbook Catalog Order No: S531 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2011 (classic)