APED 220.5 Course Outline as of Fall 2022

CATALOG INFORMATION

Dept and Nbr: APED 220.5 Title: APP ELECTRICIANS 5TH SEM
Full Title: Apprentice Electricians, Fifth 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 260E

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

Prerequisites/Corequisites:

Recommended Preparation:
Course Completion of APED 220.4

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 fifth semester of a ten-semester program. (Grade Only)
Prerequisites/Corequisites:
Recommended: Course Completion of APED 220.4
Limits on Enrollment: Indentured apprentice - apply and be accepted by the Redwood Empire Joint Apprenticeship & Training Committee (REJATC)

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 the components, functions, and applications of intrusion detection components and systems.
2. Explain the purposes, types, and calculations involved when using Overcurrent Protective Devices (OCPDs).
3. Demonstrate knowledge of panelboards, switchboards, and Short-Circuit Current Rating (SCCR).
4. Describe the function of transformer types and overcurrent protection.
5. Recognize and demonstrate an understanding of industrial blueprints.
6. Describe and demonstrate working knowledge of grounding and bonding in circuits, electrodes, and receptacles.
7. Describe and demonstrate applications of rigging, hoisting, and signaling.
8. Explain electrical safety-related hazards, fire protection equipment and devices, and apply fundamentals of safety work practices.

Topics and Scope:

I. Intrusion Detection, Level I
   A. Terms and definitions
   B. Introduction to security systems
   C. Specific applications for magnetic contacts
   D. Motion sensors
   E. Glassbreak sensors
   F. Control panels, keypads, and modules

- H. Security system design

II. Code, Standards, and Practices 3, Based on the Current National Electrical Code (NEC)
- A. Purpose of overcurrent protection and types of overcurrents
- B. OCPD categories
- C. OCPD ratings
- D. Types of OCPDs—circuit breakers
- E. Types of OCPDs—fuses
- F. Practical guidelines for OCPD ampere rating sizing
- G. Special conductor overcurrent protection permitted, including taps
- H. Calculation of available fault current
- I. Panelboards, switchboards, and SCCR—NEC 408.6

III. Transformers, Level II, Based on the Current NEC
- A. Reactors and isolation transformers
- B. Autotransformers
- C. Buck-boost transformers
- D. Understanding transformer overcurrent protection
- E. Transformer overcurrent protection with associated tap rules

IV. Blueprints, Level III
- A. Review and introduction
- B. Industrial specifications
- C. Industrial prints I
- D. Industrial prints II
- E. Industrial prints III

V. Grounding and Bonding, Level I, Based on the Current NEC
- A. Introduction
- B. Circuit basics and overcurrent protection
- C. Code arrangement and application
- D. Grounding electrodes and the grounding electrode system
- E. Requirements for services and grounded conductors
- F. Grounding electrode conductors
- G. Bonding requirements
- H. Equipment Grounding Conductors (EGCs)
- I. Grounding electrical equipment
- J. Isolated (Insulated) grounding circuits and receptacles

VI. Rigging, Hoisting, and Signaling, Level I
- A. Hoisting safety
- B. Cranes
- C. Lift planning
- D. Signaling
- E. Load weight and balance
- F. Slings and sling hitches
- G. Rigging equipment maintenance
- H. Rigging hardware
- I. Chains and chain slings
- J. Synthetic slings
- K. Wire rope and wire rope slings
- L. Fiber rope and knots
- M. Block and tackle
- N. Hoists

VII. Electrical Safety-Related Work Practices, Level I, Based on the 2021 70E
- A. Electrical safety culture
- B. Electrical hazard awareness

C. Occupational Safety and Health Administration (OSHA) considerations
D. Introduction to lockout, tagging, and the control of hazardous energy
E. Fault current fundamentals

VIII. Electrical Safety-Related Work Practices, Level II, Based on the 2021 70E
A. Introduction to National Fire Protection Association (NFPA) 70E®
B. Work involving electrical hazards
C. Identifying OCPD types
D. Methods to select arc flash Personal Protective Equipment (PPE)
E. Maintenance considerations
F. Eliminating or reducing hazards by design and upgrades

Assignment:

1. Homework assignments (1-2 sets per week)
2. Quizzes and examinations (4-6 per semester)
3. 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 10 - 25%

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

Class performances; field work	Skill Demonstrations 50 - 65%

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

Quizzes and examinations	Exams 10 - 20%

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:
Transformers Principles and Applications Textbook Catalog Order No: S476 in the Electrical Training Alliance 2020 Training Essentials Catalog. American Technical Publishers. 2006 (classic)
Industrial Blueprints Catalog Order No: S137 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2020
Blueprint Reading for Electricians Textbook Catalog Order No: S648 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2010 (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
Applied Grounding and Bonding Textbook Catalog Order No: S36820 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2020
Rigging, Hoisting, Signaling Practices Textbook Catalog Order No: S661 in the Electrical Training Alliance 2020 Training Essentials Catalog. American Technical Publishers. 2014 (classic)
Electrical Safety-Related Work Practices Textbook Catalog Order No: S944 in the Electrical Training Alliance 2020 Training Essentials Catalog. Jones & Bartlett Learning. 2018
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