APED 220.7 Course Outline as of Fall 2022

CATALOG INFORMATION

Dept and Nbr: APED 220.7 Title: APP ELECTRICIANS 7TH SEM
Full Title: Apprentice Electricians, Seventh 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 260G

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

Prerequisites/Corequisites:

Recommended Preparation:
Course Completion of APED 220.6

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 seventh semester of a ten-semester program. (Grade Only)
Prerequisites/Corequisites:
Recommended: Course Completion of APED 220.6
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 and explain the functions of basic lightning protection systems, components, and devices.
2. Explain control devices and applications for building electrical, lighting, and Heating, Ventilation, and Air Conditioning (HVAC) system automation.
3. Explain and demonstrate system integration with open protocols for using Building Automation Control network (BACnet) services.
4. Describe and demonstrate knowledge of basic lighting components and functions.
5. Explain the basic concepts of motor control.
6. Identify Alternating Current (AC) alternators, three-phase, and squirrel-cage motors.
7. Demonstrate knowledge of different types of motors, generators, motor and circuit protection, and overload protection.
8. Identify and demonstrate knowledge of different motor components, systems, and troubleshooting techniques.

Topics and Scope:

I. Lightning Protection, Level I
- A. Lightning protection systems introduction
- B. Lightning protection systems - ground work
- C. Down conductors and bonding
- D. Rooftops
- E. Concealed and structural steel systems
- F. Bonding requirements and potential equalization

- G. Surge protection devices

II. Building Automation 1: Control Devices and Applications, Level I
- A. Introduction to building automation
- B. Electrical systems
- C. Lighting sources and controls
- D. Lighting system control devices
- E. HVAC systems
- F. HVAC system applications
- G. Automated building operation and applications

III. Building Automation 2: System Integration with Open Protocols, Level I B
- A. Building automation interoperability
- B. Control concepts
- C. Communication fundamentals
- D. Introduction to BACnet
- E. BACnet transports and interworking
- F. BACnet objects and services
- G. BACnet alarming, scheduling, and trending
- H. BACnet special applications
- I. BACnet installation, configuration, and troubleshooting

IV. Lighting Essentials, Level I
- A. Basic concepts in lighting
- B. The science of light
- C. Qualities of light sources
- D. Daylighting
- E. Lamps
- F. Luminaires
- G. Lighting controls
- H. Quantity and quality of light

V. Motor Control, Level I
- A. Introduction to motor control

VI. Motors, Level I
- A. Magnetism and induction
- B. Motor nameplates
- C. AC alternators
- D. Three-Phase motors
- E. Squirrel-Cage motors

VII. Motors, Level II, Based on the Current NEC
- A. Wound-Rotor motors
- B. Single-Phase motors
- C. Motor protection
- D. Direct Current (DC) motors and generators
- E. Starting
- F. Motor branch circuits
- G. Motor branch-circuit protection
- H. Motor Overload Protection
- I. Sizing motor disconnect

VIII. Motors, Level III
- A. Synchronous motors
- B. Braking
- C. Multispeed motors
- D. Adjustable-Speed drives
- E. Bearings

F. Drive systems and clutches
G. Motor alignment
H. Troubleshooting motors
I. Special-Application motors

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 examination	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:
Building Automation: Control Devices and Applications Textbook Catalog Order No: S158 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2008 (classic)
Building Automation: System Integration with Open Protocols Textbook Catalog Order No: S519 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint

Apprenticeship and Training Committee for the Electrical Industry. 2009 (classic)
Lighting Design Basics Textbook Catalog Order No: S699 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2017
Motors Textbook Catalog Order No: S649 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2010 (classic)
Code Calculations Textbook Catalog Order No: S00820 in the Electrical Training Alliance 2020 Training Essentials Catalog. National Joint Apprenticeship and Training Committee for the Electrical Industry. 2020
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