Electrical Technology II

Course Duration: Full Year

Category: Career & Technical Education, Electives, High School

Prerequisite: Electrical Technology I

Assessment: Pre-Test, Lesson Practice, Unit Exams, Mid-Term Exam, Final Exam

Language: English

Course Overview

This CTE course builds on the foundation of Electrical Technology I to give students additional knowledge and skills they will need for a career in an electrical-related field and prepares them for the Electrical Technology certification exam. Acellus Electrical Technology II is A-G Approved through the University of California.

Scope and Sequence

Unit 1

The introductory unit of this course introduces alternating current, single phase and three phase power, practical applications of one and three phase power, conductor selection and calculations, conductors in conduit systems, de-rating conductors, and voltage drop. The introductory unit also involves loading calculations, branch circuits, and feeders, conduit selection and calculations, pull and junction boxes, calculating straight pulls for large enclosures, calculating angle pulls for large enclosures, calculating U pulls, and calculating raceways.

Unit 2

This unit discusses general lighting load calculations, storage area lighting, show window lighting allowances, track lighting uses and calculations, roof/specialty receptacles, and commercial receptacle loads and applications. The unit also discusses sign outlet requirements, motor load calculations overview and steps 1 - 6, and the installation of motors.

Unit 3

Within this unit students will learn about defining branch circuits, determining the minimum number of branch circuits, continuous loads, non-continuous loads, selecting branch circuit over-current protection, and code rules for commercial receptacles. This unit will also guide students through GFCI receptacles, code rules for GFCI receptacles, AFCI receptacles, and code rules for AFCI receptacles.

Unit 4

In this unit, students learn about rigid metal conduit codes, intermediate metal conduit code rules, electrical metallic tubing code rules, and flexible metal/non-metallic conduit code rules. Students will also learn about commercial boxes in different metallic box types.

Unit 5

This unit guides students through appliances as defined by specific articles, appliance branch circuit, over-current protection, appliance grounding, appliance disconnection means, the basic components of motor circuits, disconnect rules for motor circuits, feeder ampacity rules, feeder over-current protection rules, feeder temperature limitations 110.14c, feeder conductor selection, feeder component selection, and feeder conductor selection step 1. The unit will also guide students through minimum feeder conductor selection step 2, feeder conductor selection step 3, feeder neutral conductor selection, harmonic loads, and surface metal raceways, as well as multi outlet assemblies, communication systems, and floor outlets.

Unit 6

This unit discusses the transformer overview, transformer construction and theory transformer, over-current protection, transformer connections, connecting single phase transformers, connecting three phase transformers,

the open delta system, three wire delta systems, three phase, and four wire way systems. This unit also discusses the commercial service entrance, commercial metering systems, the commercial electrical service, the commercial service entrance conductor size, working space around equipment considerations, and the grounding system.

Unit 7

Students will gain knowledge regarding incandescent lighting, fluorescent lighting, HID lighting, LED lighting, lighting circuit design, and lighting over-current protection, as well as types of luminaries, luminaire listing and labeling, code requirements for installing recessed luminaries, and emergency and legally required standby power systems.

Unit 8

Students begin this unit learning about overcurrent protection overview, disconnect switch coordination, fuses and circuit breakers, dual element time delay fuse, non time delay fuses, cartridge fuses, plug fuses, and testing fuses. Students will also learn about circuit breakers, thermal magnetic circuit breakers, circuit breaker coordination, HACR circuit breakers, and low voltage lighting systems.

Unit 9

In this unit students will learn about refrigeration system components, cooling system controls in a commercial setting, electrical system requirement, wall rough in with MC cable, wall rough in with EMT, building a conduit rack system with unistrut, the building grounding system, pulling wire for office lighting, pulling wire for office power, installing stranded wire on a lighting circuit, and installing stranded wire on three way switches, installing communication conduit systems, installing cat 5 cable systems, grounding the transformer, installing fluorescent lighting, installing outdoor lighting systems.

Unit 10

Within this unit students gain knowledge understanding basic motor control components, installing a motor controller, the basic start stop system, the forward reverse system, multiple e-stop locations, wiring the contactor for start stop motor operation, wiring the contactor for forward reverse operation, wiring a basic start stop with the motor in operation, and wiring a basic forward reverse with motor in operation. Students will also gain knowledge with a relay and how to wire a relay, using a timing relay to turn on a single light, and using a timing relay to turn on a run/stop light.

Unit 11

In the concluding unit of this course students will learn about troubleshooting a bad coil, determining the health of a motor, thermal overload rules, troubleshooting a bad pushbutton, troubleshooting a bad wire, troubleshooting a bad switch, troubleshooting a bad light fixture, and troubleshooting rules and practices.