

BI 0026 - RESIDENTIAL HOUSE WIRING AND CODES

Catalog Description

Formerly known as CET 26

Hours: 108 (36 lecture, 72 laboratory)

Description: Introduction in the electrical trade. Inside wiring as applied to residential, commercial, and industrial structures. Electrical service requirements for photovoltaic systems. Use of tools and materials of the trade. Review of the National Electrical Code and the applications and California Electrical Code updates to the California Green Technology and "Net Zero Energy" policies. (CSU)

Course Student Learning Outcomes

- CSLO #1: Demonstrate safe practices following industry and regulatory standards.
- CSLO #2: Install residential electrical systems to meet code and inspection requirements.
- CSLO #3: Demonstrate various methods of installing and connecting wiring in residential applications.

Effective Term

Fall 2021

Course Type

Credit - Degree-applicable

Contact Hours

108

Outside of Class Hours

54

Total Student Learning Hours

162

Course Objectives

Lecture Objectives:

1. Discuss and demonstrate the safety aspects of correct tool for electrical work;
2. Identify and discuss symbols employed in electrical blueprints;
3. Describe various methods of calculating residential, commercial, and industrial wiring and electrical loads as required by the National Electrical Code;
4. Describe the various overcurrent protection devices in residential, commercial, and industrial installations, the wiring, and the calculated electrical loads as required by the National Electrical Code
5. Describe and demonstrate various methods of installing and connecting wiring in practical applications following code requirements;
6. Identify and discuss California Green Technology and "Net Zero Energy" policies related to residential electrical construction.

Laboratory Objectives:

1. Calculate correct wire size and conduit size to identify conduit type and size;

2. Apply safety practices in laboratory activities;
3. Install electrical systems to meet code and inspection requirements;
4. Apply electrical theories to electrical circuitry and its applications;
5. Calculate amperage needed to perform function of a circuit;
6. Calculate type and wire size to carry the amperage;
7. Determine type and size of conduit compatible with a selected wire size;
8. Connect circuit wires in the box including continuity of ground and pigtailed when applicable;
9. Install the number of circuits required by code;
10. Install from code requirements correct number and type of circuits;
11. Determine correct type of circuit necessary to provide power for different applications;
12. Determine correct type of circuit necessary to provide power for photovoltaic systems;
13. Install isolated ground for all circuits supplying power to computer work station areas;
14. Calculate total load for the structure to determine minimum service load;
15. Prepare proper grounding for service load for UFER and ground rod applications;
16. Assemble sub-panels including main disconnect requirements and proper grounding methods;
17. Compare and contrast grid and stand alone photovoltaic systems;
18. Identify additional service panel connections required for photovoltaic system installations;
19. Determine and apply appropriate California Green Technology and "Net Zero Energy" policies to lab electrical wiring projects and exercises.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Projects
 - Example: Major student projects will be graded according to completeness, adherence to building codes, and industry standards. The grading is determined by a grading rubric. Example: Wiring of a 3-way switching of a light.
- Skill Demonstrations
 - Example: Students will analyze electrical systems according to the plan specifications and evaluate to California Electrical and National Electrical Code standards. The grading is determined by a grading rubric.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. Lab techniques will be presented in a "describe / show / review" methodology. Students will complete a safety test before using equipment. Instructor will work with students until they can successfully complete the test with 100% success rate. (Laboratory Objective 2)

Lecture:

1. Instructor will lecture on the California Green Technology and "Net Zero Energy" policies related to new and remodeled electrical construction. The student will be given an opportunity to clarify any questions in an instructor-guided discussion. (Lecture Objective 6)

Distance Learning

1. Students in online classes participate, individually and in groups, in discussion boards and respond to weekly assignments via the Learning Management System. The instructor will provide documented material (including videos) explaining or exploring the course content and provide individual feedback on all assignments. Instructor will demonstrate proper wiring techniques via online conferencing tool and record the session for asynchronous participation. students will demonstrate understanding by responding to discussion post, submitting a student led instructional video or slideshow, and/or an image of their completed wiring assignment. (Lecture Objective 5)

- OER Link:
- OER:
- 2019 California Electrical Code
 - Author: California Building Standards Commission
 - Publisher: National Fire Protection Agency
 - Publication Date: 2019
 - Text Edition:
 - Classic Textbook?: No
- OER Link:
- OER:

Other materials and-or supplies required of students that contribute to the cost of the course.

Typical Out of Class Assignments Reading Assignments

1. Read and answer chapter-ending questions on National Electrical Code from textbook. 2. Read instructor provided handouts to be prepared for in-class discussions on local building codes.

Writing, Problem Solving or Performance

1. Calculate wire sizes determined through amperage calculations for electric dryer. 2. Pull wire to service all receptacles in a circuit.

Other (Term projects, research papers, portfolios, etc.)

Required Materials

- Electrical Wiring, Residential
 - Author: Ray C. Mullin, Phil Simmons
 - Publisher: Cengage Learning
 - Publication Date: 2020
 - Text Edition: 20th
 - Classic Textbook?: No
 - OER Link:
 - OER:
- National Electrical Code
 - Author: National Fire Protection Agency
 - Publisher: National Fire Protection Agency
 - Publication Date: 2017
 - Text Edition:
 - Classic Textbook?: No