CNST A275: RESIDENTIAL ELECTRICAL WIRING

Item	Value
Curriculum Committee Approval Date	12/02/2020
Top Code	095220 - Electrical
Units	5 Total Units
Hours	162 Total Hours (Lecture Hours 54; Lab Hours 108)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Residential electrical construction, wiring principles and practices, study and application of NEC code to comply with building requirements. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Properly install a branch circuit with all the components sized per the NEC (National Electrical Code) and install any type of switching, receptacle or light fixture that will be on that circuit.
2. Determine the difference between 120 volt circuits and 240 volt circuits in any type of electrical panel and be able to calculate the appropriate size in amps with the use of electrical math equations.

Course Objectives

- 1. Use the index of the National Electrical Code (NEC) to identify specific codes that are relevant to residential buildings.
- 2. Identify the basic components of a residential wood framed house.
- 3. Read a measuring tape rapidly and accurately to the nearest 1/16th of an inch.
- 4. Read and comprehend electrical definitions and terminology of the NEC.
- 5. Apply the appropriate formulas for problem solving of load calculations for a residential home.
- 6. Recognize and properly name various connectors, conduit, fittings, and boxes necessary for the installation of receptacles and switches.
- 7. Draw an appropriate wiring diagram for single pole switches, three-way switches, four-way switches, split receptacles and duplex receptacles.
- 8. Calculate the appropriate box size per the NEC.
- 9. Calculate the appropriate wire size per the NEC.
- 10. Use Ohms law to perform calculations to determine volts, amperes, and watts.
- 11. Determine the proper spacing for receptacles for general purpose branch circuits
- 12. Determine the proper locations for smoke detectors.

Lecture Content

Orientation to lab classroom equipment, i.e. work stations. Safety procedures for all work in the lab. Safety Examination. General information for electrical installation. Ohms law formulas. Electrical symbols and outlets. Electrical terminology. Definitions per the NEC. (National Electrical Code) Branch circuit types and locations. Sizing conductors for current capacity. Sizing plastic and metal boxes for the number of conductors. Examining the different types of cables. (Romex, metal cable , armored cable, etc.) Box connectors. Wire splicing. Wire connecting devices. (wire nuts) Switch control types. Receptacle types. Bonding all components. Wiring diagrams. Reading wiring diagrams. Drawing wiring diagrams Kitchen receptacle requirements. Code spacing requirements. Placement of receptacles. Bathroom requirements. Code spacing requirements. Placement of receptacles. 240 volt circuits. Electric Dryers Electric Ovens Garage code requirement. Lighting code requirements. Receptacle code requirements. Service entrance equipment. Overhead p anels. Lateral service panels. Service entrance load calculations. Math formulas to calculate watts and amperes. Determining panel size. Grounding or bonding the service panel. Tables for grounding. Ufer ground. Cold water pipe. Grounding rod. Service installation. Ampere sizing. Conductor size

Lab Content

Orientation to lab classroom equipment, i.e. work stations. Safety procedures for all work in the lab. Safety Examination. General information for electrical installation. Ohms law formulas. Electrical symbols and outlets. Electrical terminology. Definitions per the NEC. (National Electrical Code) Branch circuit types and locations. Sizing conductors for current capacity. Sizing plastic and metal boxes for the number of conductors. Examining the different types of cables. (Romex, metal cable , armored cable, etc.) Box connectors. Wire splicing. Wire connecting devices. (wire nuts) Switch control types. Receptacle types. Bonding all components. Wiring diagrams. Reading wiring diagrams. Drawing wiring diagrams Kitchen receptacle requirements. Code spacing requirements. Placement of receptacles. Bathroom requirements. Code spacing requirements. Placement of receptacles. 240 volt circuits. Electric Dryers Electric Ovens Garage code requirement. Lighting code requirements. Receptacle code requirements. Service entrance equipment. Overhead p anels. Lateral service panels. Service entrance load calculations. Math formulas to calculate watts and amperes. Determining panel size. Grounding or bonding the service panel. Tables for grounding. Ufer ground. Cold water pipe. Grounding rod. Service installation. Ampere sizing. Conductor size

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- Lab (04)
- DE Live Online Lab (04S)

Instructional Techniques

Lecture, demonstrations, cooperative learning groups, and lab assignments.

Reading Assignments

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Writing Assignments

Short answer homework assignments and electrical house load calculations.

Out-of-class Assignments

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Demonstration of Critical Thinking

Students will be given various types of written tests for their evaluation in this course during this semester. These will include identification, multiple choices, fill-in the blank, and mathematical calculation. Students will be required to do lab assignments to meet code requirements per the NEC (National Electrical Code) Students will be required to participate in class discussions and presentations.

Required Writing, Problem Solving, Skills Demonstration

Short answer homework assignments and electrical house load calculations.

Textbooks Resources

1. Required Mullin, Ray C.. Electrical Wiring Residential, ed. New York: Thomson Delmar Learning, 2005 Rationale: Mullin, Ray C.. Electrical Wiring Residential.New York: Thomson Delmar Learning, 2005. 2. Required National Fire Protection Association. National Electrical Code 2005, ed. Massachusetts: National Fire Protection Association, Inc., 2004 Rationale: National Fire Protection Association. National Electrical Code 2005.Massachusetts: National Fire Protection Association, Inc, 2004