Course Acronym:	CTEC
Course Number:	172
Descriptive Title:	Residential Electrical Wiring
Division:	Industry and Technology
Department:	Construction Technology
Course Disciplines:	Construction Technology
Catalog Description:	This course focuses on residential electrical wiring in accordance with the National Electric Code (NEC). Topics include print reading, developing wiring diagrams, wiring, grounding and the placement of lights, switches, receptacles and fixtures. The proper selection and use of conduits, determination of branch circuit requirements, proper selection of circuit breakers, and the installation of service entrance and sub-panels are also covered. The techniques of electrical wiring are learned through construction laboratory work, which requires the use of standard electrical tools and materials.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2.5
Hours Laboratory (per week):	5
Outside Study Hours:	5
Total Course Hours:	135
Course Units:	4
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	04/16/2001
Transfer UC:	No
Effective Date:	
General Education: ECC	
Term:	
Other:	

CSU GE:	
Term:	
Other:	
IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Electrical Wiring Materials and Methods** Students will be able to demonstrate a basic application of materials and methods commonly used in residential construction. **SLO #2 Duplex Receptacle Wiring** Students will be able to wire a duplex receptacle. **SLO #3 Hole Boring in Framing Materials** Students will be able to bore holes in framing materials to accommodate non-metallic sheathed cables.
Course Objectives:	1. Identify components of residential rough and finish wiring systems. 2. Analyze house plans to determine proper placement of switches, lights and receptacles in accordance with the NEC. 3. Calculate and estimate the types and quantities of non-metallic sheathed cable required to rough wire a residential dwelling. 4. Layout and install outlet boxes and cable systems. 5. Install ground-fault circuit interrupters and grounding systems in accordance with NEC. 6. Install switches, lights, receptacles and devices in compliance with the NEC. 7. Apply power to the circuits to verify the proper operation of all devices. 8. Determine the number of branch circuits, their loading and balancing, and the proper size of circuit breakers for each branch. 9. Calculate the types and quantity of flex wiring needed to wire a residential dwelling. 10. Layout and install outlet boxes, service panels, and supports for the various conduit systems. 11. Calculate the appropriate type and size of wires between the junction boxes.
Major Topics:	**I. OVERVIEW OF ELECTRICAL WIRING (5 hours, lecture)** A. Safety instructions B. Career opportunities in the electrical trade **II. OVERVIEW OF ELECTRICAL WIRING (10 hours, lab)** A. Safety test B. Tour of lab

1. Material storage

2. Building sites

3. Safety equipment

4. Large tool storage

C. Toolroom

III. TOOLS AND MATERIALS USED IN RESIDENTIAL WIRING (5 hours, lecture)

A. Tools for the electrician

B. Cables and switches

C. Electrical boxes and accessories

D. Protective devices

IV. TOOLS AND MATERIALS USED IN RESIDENTIAL WIRING (10 hours, lab)

A. Tools for the electrician

B. Cables and switches

C. Electrical boxes and accessories

D. Protective devices

V. ELECTRICAL ENERGY FUNDAMENTALS (5 hours, lecture)

A. Electrical terms

B. Types of electrical circuits

C. Safety and grounding essentials

D. Electrical symbols and devices

VI. ELECTRICAL ENERGY FUNDAMENTALS (15 hours, lab)

A. Electrical terms

B. Types of electrical circuits

C. Safety and grounding essentials

D. Electrical symbols and devices

VII. NEC (5 hours, lecture)

A. Building codes

B. Code definitions relating to devices

C. Wiring and grounding

D. Underwriters Laboratories

VIII. NEC (15 hours, lab)

A. Building codes

B. Code definitions relating to devices

C. Wiring and grounding

D. Underwriters Laboratories

IX. READING BASIC HOUSE PLANS, DEVELOPING WIRING DIAGRAMS AND ESTIMATING (5 hours, lecture)

A. Locating lightening and appliance circuits

B. Locating switches for controlling lighting circuits

C. Determining type and size of conduits and wiring

D. Analyzing plans to determine the amount type and size of materials needed to wire a house

X. READING BASIC HOUSE PLANS, DEVELOPING WIRING DIAGRAMS AND ESTIMATING (15 hours, lab)

A. Locating lightening and appliance circuits

B. Locating switches for controlling lighting circuits

C. Determining type and size of conduits and wiring

D. Analyzing plans to determine the amount type and size of materials needed to wire a house

XI. PRINT ANALYSIS TO DETERMINE AMOUNT AND TYPES OF MATERIALS NEEDED TO WIRE A HOUSE (10 hours, lecture)

A. Layout and installation of outlet boxes and the service panel

B. Boring holes in structural members for conduit and cables

C. Installation of cables and conduits

	D. Installation of Ground Fault Circuit Interrupter (GFCI) and ground systems **XII. PRINT ANALYSIS TO DETERMINE AMOUNT AND TYPES OF MATERIALS NEEDED TO WIRE A HOUSE (15 hours, lab)** A. Layout and installation of outlet boxes and the service panel B. Boring holes in structural members for conduit and cables C. Installation of cables and conduits D. Installation of and ground systems **XIII. FINISH WIRING (10 hours, lecture)** A. Connection of all lights, switches, receptacles and devices B. Inspection of circuits to ensure compliance with NEC **XIV. FINISH WIRING (10 hours, lab)** A. Connection of all lights, switches, receptacles and devices B. Inspection of circuits to ensure compliance with NEC
Total Lecture Hours:	45
Total Laboratory Hours:	90
Total Hours:	135
Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Given an electrical plan, wire a lighting circuit in accordance with the NEC. Consult instructor for evaluation.
Critical Thinking Assignment 1:	Analyze and modify a floor plan to determine the number and placement of appliance outlets in accordance with the NEC. Submit floor plan to the instructor.
Critical Thinking Assignment 2:	Given a wiring diagram, estimate and record in a one-page paper, the quantities of materials needed to wire a house. Submit needed material list to the instructor.
Other Evaluation Methods:	Completion Laboratory Reports Matching Items Multiple Choice Other Exams Performance Exams Quizzes True/False
Instructional Methods:	Demonstration Discussion

	Field trips Group activities Guest speakers Lab Lecture Multimedia presentations Role play/simulation
If other:	
Work Outside of Class:	Problem solving activity Required reading Study
If Other:	
Up-To-Date Representative Textbooks:	National Fire Protection Association (NFPA), NFPA 70 NATIONAL ELECTRICAL CODE 2020 HANDBOOK, 1st edition, Cengage Learning, 2020 Ray Mullin and Phil Simmons, ELECTRICAL WIRING: RESIDENTIAL WIRING, 20th edition, Cengage Learning, 2021 National Fire Protection Association (NFPA), NFPA 70 NATIONAL ELECTRICAL CODE,1st edition, Cengage Learning, 2020
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	Safety glasses Appropriate shoes and attire for construction work
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
Requisite and Matching skill(s):Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable	
Requisite course:	
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course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Tim Meza
Date:	02/01/2001
Original Board Approval Date:	04/16/2001
Last Reviewed and/or Revised by:	ROSS DURAND
Date:	02/15/2023
Last Board Approval Date:	07/17/2023 effective FALL 2024