ELECTRICAL WIRING INSTALLATIONS  
Course Syllabus

Course Number: CNST-1707A,B,C  
OCAS Code: None  
Course Length: 130 Hours  
Career Cluster: Architecture and Construction  
Career Pathway: Construction  
Career Major(s): Commercial Electrician’s Assistant

Pre-requisite(s): In this course the student will learn the various wiring methods used in different types of occupancies and structures. The wiring methods include, MC cable, NM cable, conduit, cords, and underground cables. The student will learn how to install these types of wiring methods by industry standards and National Electric Codes. Students will practice the wiring methods by installing basic circuits.

Textbooks: TBA

Course Objectives: I. Basic Circuits, Methods and Procedures for Wiring Premises

A. Identify Material Related to Electrical Installation.
   a. Identify various boxes used in electrical construction.
   b. Identify various conduits and fittings required for electrical installations.
   c. Identify various devices and their covers required for electrical installations.
   d. Identify various cables, cords, and flexible conduits required for electrical installations.

B. Complete an Introduction to Electrical Wiring Methods.
   a. Explain various techniques used to install devices.
   b. Perform various device installations.
   c. Demonstrate the ability to mount device boxes used in electrical wiring.
   d. Explain and demonstrate wiring circuits for duplex receptacles.
   e. Explain and demonstrate wiring circuits for single pole switches.
   f. Explain and demonstrate wiring circuits for three way switches.
   g. Explain and demonstrate wiring circuits for four way switches.

C. Understand Basic Wiring Methods.
   a. Describe how to determine electric service requirements for various occupancies
   b. Explain the grounding requirements of a electric service.
   c. Calculate and select service-entrance equipment.
   d. Select the proper wiring methods for various types of structures.
   e. Explain the role of the NEC® in wiring methods.
   f. Compute branch circuit loads and explain their installation requirements.
   g. Explain the types and purposes of equipment grounding conductors.
   h. Explain the purpose of ground fault circuit interrupters and tell where they must be installed.
   i. Size outlet boxes and select the proper type for different wiring methods.
   j. Describe rules for installing electric space heating and HVAC equipment.
   k. Explain how wiring devices are selected and installed.
   l. Describe the installation and control of lighting fixtures.
D. Identify Receptacles Used in Different Applications.
   a. Identify various types of receptacles used in residential and commercial installations and discuss their purposes.
   b. Locate code requirements in NEC for receptacles.
   c. Discuss ground fault circuit interrupter receptacles and their operations.
   d. Choose correct receptacles by the ampacity of the equipment being connected.
   e. Identify equipment used to protect receptacles installed in specific environments.

E. Complete Electrical Installations.
   a. Install the following receptacle circuits:
      b. Receptacle
      c. Multi-receptacle
      d. Switched receptacle
      e. 240v dryer receptacle
      f. GCFI receptacle
      g. GCFI Feed Through receptacle
      h. Weatherproof receptacle

F. Demonstrate Knowledge of Electrical Switches.
   a. Identify various types of switches used in residential and commercial installations and discuss their purposes.
   b. Locate code requirements in NEC for switches and lighting outlets.
   c. Discuss single pole switches and their operations.
   d. Discuss 3 way switches and their operations.
   e. Discuss 4 way switches and their operations.
   f. Identify equipment used to protect switches installed in specific environments.

G. Complete Electrical Installations.
   a. Install the following switch circuits:
      b. single pole switch
      c. dimmer
      d. multi-light
      e. multi-switch
      f. light first switch

H. Complete Electrical Installations.
   a. Install the following:
      b. Three way switch project
      c. Light first three-way switch
      d. Four-way switch project
      e. Light first four way switch
      f. Multi four way
      g. Combination Switch and Receptacle Circuits

I. Demonstrate Hand Bending.
   a. Identify the methods of hand bending conduit.
   b. Identify the various methods used to install conduit.
   c. Use math formulas to determine conduit bends.
   d. Make 90° bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.
   e. Cut, ream, and thread conduit.

J. Understand Raceways, Boxes, and Fittings.
   a. Describe various types of cable trays and raceways.
   b. Identify and select various types and sizes of raceways.
   c. Identify and select various types and sizes of cable trays.
d. Identify and select various types of raceway fittings.1  
e. Identify various methods used to install raceways.1  
f. Demonstrate knowledge of NEC® raceway requirements.1  
g. Describe procedures for installing raceways and boxes on masonry surfaces.1  
h. Describe procedures for installing raceways and boxes on concrete surfaces.1  
i. Describe procedures for installing raceways and boxes in a metal stud environment.1  
j. Describe procedures for installing raceways and boxes in a wood frame environment.1  
k. Describe procedures for installing raceways and boxes on drywall surfaces.1  
l. Recognize safety precautions that must be followed when working with boxes and raceways.1  

K. Perform Basic Commercial Installations.  
a. Perform following pipe bends on EMT using bending tools:  
i. 90° bend  
ii. back to back  
iii. box offset  
iv. 4' offset  
v. three-point saddle  
vi. four-point saddle  
vii. 90° PVC bend  

L. Install basic commercial circuits using MC Cable  
a. Identify various types and uses for MC and AC Cable  
b. Install MC Cable according to National Electric Codes  
c. Connect devices and lighting outlets using MC Cable.  

M. Install Devices for Trim Out of Electrical Wiring.  
a. Install receptacles  
b. Install switches.  
c. Assemble and install lighting fixtures and ceiling fan fixtures.  
d. Connect and install various appliances.  
e. Connect and install various pieces of HVAC equipment.  
f. Install and connect circuit breakers in electrical panel.  

N. Test and Troubleshoot Electrical System and Circuits.  
a. Test receptacles.  
b. Test switches and lighting fixtures for correct operation.  
c. Identify all circuits and label panel accordingly.  
d. Test HVAC equipment.  
e. Test appliances for proper operation.  

O. Complete Special Circuits and Wiring Installations.  
a. Install the following:  
b. Ceiling fan  
c. Fluorescent light  
d. Par flood lights with motion detectors  
e. Quartz light  
f. High pressure sodium lights  
g. Recess can light  
h. Heater/vent/light  
i. Door bell  
j. Low voltage  
k. Telephone installation  
l. TV coax cable installation  
m. Smoke detector
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P. Understand Electric Service.

Q. Describe how to determine electric service requirements for dwellings. 1

R. Explain the grounding requirements of a residential electric service. 1

S. Calculate and select service-entrance equipment. 1

T. Select the proper wiring methods for various types of residences. 1

U. Install an Overhead electric service. 1

V. Install an underground lateral electric service. 1

1 NCCER objectives

Teaching Methods: The class will primarily be taught by the lecture and demonstration method and supported by various media materials to address various learning styles. There will be question and answer sessions over material covered in lecture and media presentations. Supervised lab time is provided for students to complete required projects.

Grading Procedures: 1. Students are graded on theory and shop practice and performance.
2. Each course must be passed with seventy (70%) percent or better.
3. Grading scale: A=90-100%, B=80-89%, C=70-79%, D=60-69%, F=50-59%.

Description of Classroom, Laboratories, and Equipment: Tulsa Technology Center campuses are owned and operated by Tulsa Technology Center School District No. 18. All programs provide students the opportunity to work with professionally certified instructors in modern, well-equipped facilities.

Available Certifications/College Credit: The student may be eligible to take state, national or industry exam after completion of the program. College credit may be issued from Oklahoma State University-Okmulgee or Tulsa Community College. See program counselor for additional information.

College Credit Eligibility: The student must maintain a grade point average of 2.0 or better.