

---

<b>Course Prefix/No.:</b>	<b>EEM 165</b>
<b>Course Title:</b>	<b>Residential/Commercial Wiring</b>
<b>Lecture Hours/Week:</b>	<b>2.0</b>
<b>Lab Hours/Week:</b>	<b>6.0</b>
<b>Credit Hours/Semester:</b>	<b>4.0</b>

[Distance Learning Attendance/VA Statement](#)  
[Textbook Information](#)

### **COURSE DESCRIPTION**

This course is a study of wiring methods and practices used in residential and commercial applications.

### **COURSE COMPETENCIES**

Upon successful completion of this course, the student should be able to:

#### **Module 1 – Residential/Commercial Service Entrance Equipment and Installation**

- Identify common overhead and underground service equipment and materials.
- Explain common installation techniques for overhead and underground service entrances.
- Perform proper panelboard installation techniques.
- Perform proper subpanel installation techniques.
- Explain upgrade techniques for existing service entrances.

#### **Module 2 – Residential Cable Installation and Preparation**

- Develop a material list for all parts that are to be needed to complete a rough-in.
- Select an appropriate cable type for a given residential application.
- State several NEC<sup>®</sup> requirements for the installation of common cable types which are used in residential wiring.
- Perform proper techniques for preparing for cable runs in a dwelling made of wooden stud supports.
- Perform proper common installation techniques for installing cable in existing walls and ceilings.
- Perform proper methods of securing and supporting a cable run in a residential wiring application.
- Perform proper installation techniques for securing the cable to an electrical box and preparing the cable for termination in the box.

#### **Module 3 – Residential Rough-In Materials, Requirements, and Methods**

- Discuss the selection of appropriate wiring methods, conductor types, and electrical boxes for a residential electrical system rough-in.
- Perform proper general wiring requirements as they apply to residential rough-in wiring.
- Perform proper general requirements for conductors as they apply to residential rough-in wiring.

- Perform proper general wiring requirements for electrical box installation as they apply to residential rough-in wiring.
- List several general requirements that pertain to the wiring methods used during the rough-in stage of a residential wiring system.

#### **Module 4 – Residential/Commercial Branch Circuit Installation**

- Perform a proper installation of all general lighting branch circuits.
- Perform a proper installation of the small appliance branch circuits (Residential).
- Perform proper installations of an electric range, cooktop, and/or wall-mounted oven branch circuit.
- Perform a proper installation of the garbage disposal branch circuit.
- Perform a proper installation of the dishwasher branch circuit.
- Perform a proper installation of the laundry branch circuit (Residential).
- Perform a proper installation of the electric clothes dryer branch circuit.
- Perform a proper installation of the water pump branch circuit.
- Perform a proper installation of the electric water heater branch circuit.
- Perform a proper installation of branch circuits for heating and air conditioning.
- Perform a proper installation of branch circuits for smoke detectors.
- Perform a proper installation of a low-voltage doorbell chime circuit.
- Perform a proper installation of branch circuits for attic ventilation (Residential).

#### **Module 5 – Residential/Commercial Switching Circuit Installation**

- Select an appropriate switch type for a specific switching situation.
- Select a switch with the proper ampacity rating for a specific switching application.
- List NEC<sup>®</sup> requirements as they apply to switches.
- Perform proper installation techniques for single-pole, three-way, and four-way switches.
- Perform proper installation techniques for switched duplex receptacles, combination switches, and double-pole switches.
- Perform proper installation techniques for dimmer switches and ceiling fan/light pull switches.

#### **Module 6 – Commercial Raceway and Cable Installation**

- Select an appropriate raceway size and type for a given application.
- Perform proper techniques for cutting and reaming electrical conduit.
- Perform common bends used in conduit installations.
- Perform proper techniques for bending conduit.
- Perform proper installation techniques for common raceway types.
- Perform proper installation techniques for installing conductors in a raceway.

#### **Module 7 – Residential/Commercial Video, Voice, and Data Wiring Installation**

- List several common terms and definitions used in video, voice, and data cable installations.
- Identify common materials and equipment used in video, voice, and data wiring.
- Explain EIA/TIA 570 standards for the installation of video, voice, and data wiring.
- Perform proper installation techniques for the installation of video, voice, and data wiring.

#### **Module 8 – Service Panel Trim-Out, System Check, and Troubleshooting**

- Select the proper overcurrent protection device for a specific branch circuit.
- Give examples of common circuit breakers used in a service panel or a subpanel.

- Properly install circuit breakers into a service panel or subpanel.
- Perform proper techniques for trimming out a residential/commercial panel.
- Explain the importance of checking out all of the branch circuits and verify the integrity of each.
- Troubleshoot common residential/commercial electrical system problems.

## STANDARDS

Assignments and attendance must be completed as designated in “Evaluation Strategies/Grading.” Criteria for minimal acceptable performance will be provided by the instructor.

## REQUIREMENTS

### Attendance Policy

The college attendance policy, stated in the college handbook, will be honored. The instructor will provide specific requirements for the course.

### Academic Honesty

Students are expected to adhere to the college policy regarding student conduct as stated in the college handbook.

### Assignments

Students are expected to complete all assignments and any supplementary exercises designated by the instructor.

## EVALUATION STRATEGIES/GRADING

Students must complete all modules, including assignments, projects, labs, and tests. Students must earn at least a “C” in order for the course to serve as a prerequisite and for the course to apply towards a certificate.

### Grading Scale

A = 90 – 100  
 B = 80 – 89.9  
 C = 70 – 79.9  
 D = 60 – 69.9  
 F = 00.0 – 59.9

### Evaluation Method

Tests/Projects (minimum of four total)	6.250% for each Module
Work Attitude	3.125% for each Module
Lab	3.125% for each Module

12.5% X 8 module grades = 100% Final Grade

Work Attitude is defined as:

- |  |  |
|--|--|
| <input type="checkbox"/> Participation | <input type="checkbox"/> Responsibility      |
| <input type="checkbox"/> Cooperation   | <input type="checkbox"/> Professionalism     |
| <input type="checkbox"/> Appearance    | <input type="checkbox"/> Attendance          |
| <input type="checkbox"/> Effort        | <input type="checkbox"/> Self Motivation     |
| <input type="checkbox"/> Safety        | <input type="checkbox"/> Works Independently |

**ENTRY LEVEL SKILLS**

The student must be able to read and solve basic mathematical equations.

**PREREQUISITES:** RDG 031 or equivalent, BCT 105, BCT 112, EEM 105, and EEM 141

**CO-REQUISITES:** None

**Disabilities Statement:** Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.

## **Co-requisite:**

BCT 141

## **METHODS OF INSTRUCTION:**

Lectures, reading assignments, projects, discussions, video presentations, multi-media presentations, and web content are the major teaching methods used in this course. See instructor for specifics.

## **LAB EXERCISES (See addendum or instructor for additional details):**

### **Module 1 – Residential/Commercial Service Entrance Equipment and Installation**

- Identification of common overhead and underground service equipment and materials.
- Common installation techniques for overhead and underground service entrances.
- Panelboard installation techniques.
- Subpanel installation techniques.
- Existing service entrance upgrades techniques.

### **Module 2 – Residential Cable Installation and Preparation**

- Rough-in material list.
- Cable type select
- Rough-in NEC<sup>®</sup> requirements.
- Preparing for cable runs in a dwelling made of wooden stud supports.
- Installing cable in existing walls and ceilings.
- Securing and supporting cable runs.
- Installation techniques for securing the cable to an electrical box and preparing the cable for termination in the box.

### **Module 3 – Residential Rough-In Materials, Requirements, and Methods**

- Circuit layout
- General requirements for conductors.
- General wiring requirements for electrical box installation.
- General requirements that pertain to wiring methods.

### **Module 4 – Residential/Commercial Branch Circuit Installation**

- General lighting, small appliance, electric range, cooktop, and/or wall-mounted oven, garbage disposal, dishwasher, laundry, electric clothes dryer, water pump, electric water heater, heating and air conditioning, smoke detectors, low-voltage doorbell chime circuit, attic ventilation.

### **Module 5 – Residential/Commercial Switching Circuit Installation**

- Switch selection.
- NEC<sup>®</sup> requirements that apply to switches.
- Single-pole, three-way, and four-way switches.
- Switched duplex receptacles, combination switches, and double-pole switches.
- Dimmer switches and ceiling fan/light pull switches.

### **Module 6 – Commercial Raceway Installation**

- Raceway sizing/type selection.
- Cutting and reaming electrical conduit.
- Conduit bending.
- Installing conductors in a raceway.

### **Module 7 – Residential/Commercial Video, Voice, and Data Wiring Installation**

- Identify common materials and equipment used in video, voice, and data wiring.
- EIA/TIA 570 standards for the installation of video, voice, and data wiring.

### **Module 8 – Service Panel Trim-Out, System Check, and Troubleshooting**

- Overcurrent protection device selection.
- Circuit breakers installation.
- Trimming out a residential panel.
- Checking branch circuit integrity.
- Troubleshoot common problems.