

COURSE INFORMATION:

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

[*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[®] 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[®] 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:

- Participation
- Cooperation
- Appearance
- Effort
- Safety
- Responsibility
- Professionalism
- Attendance
- Self Motivation
- Works Independently

ENTRY LEVEL SKILLS:

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

PREREQUISITES/CO-REQUISITES:

Prerequisites:

RDG 031 or equivalent, BCT 105, BCT 112, EEM 105, and EEM 141

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[®] 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[®] 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.