



## Course Outline/Description— Residential and Commercial Electricity



### DIPLOMA PROGRAM

24 weeks – 26 semester credit hours (DAY)

52 weeks – 26 semester credit hours (EVENING)

Total 720 hours

### OBJECTIVE

The Residential and Commercial Electricity\* student will be able to design, install, troubleshoot, replace, upgrade, and maintain electrical equipment in residential and commercial electrical systems per requirements and guidelines mandated by the National Electrical Code. Students are instructed in the identification, care, and proper use of electrical tools and equipment. They learn mathematics for use in the electrical trade. They also study basic theory, electrical control systems, and single-phase and multi-phase electrical motors. Power supplies and power distribution for commercial establishments are taught.

### EMPLOYMENT OPPORTUNITIES

Graduates of this course are prepared for entry-level employment as electrical installers and troubleshooters, and as maintenance and electrical assistants in residential, commercial, and public establishments.

|         | COURSE TITLE                                       | CREDIT HOURS |
|---------|--|--------------|
| RCE 101 | Introduction to Electricity                        | 0.5          |
| RCE 102 | Mathematics and Blueprint Reading for Electricians | 4.5          |
| RCE 103 | Basic Electricity                                  | 4.0          |
| RCE 104 | Electrical Measuring Devices                       | 1.0          |
| RCE 105 | Residential Wiring Systems                         | 5.5          |
| RCE 106 | AC Theory  | 2.0          |
| RCE 107 | Electrical Motors, Controllers, and PLCs           | 4.5          |
| RCE 108 | Commercial Wiring Systems                          | 1.5          |
| PD 616  | Professional Development                           | 2.5          |

\* Students in this program are eligible to receive industry recognized certification from the National Occupational Competency Testing Institute (NOCTI) upon successful completion of certification exams.



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### **RCE 101 INTRODUCTION TO ELECTRICITY**

This course includes a presentation of electrical occupations together with general safety guidelines. Students receive an introduction to Green Technology and Energy Efficiency in the trades.

### **RCE 102 MATHEMATICS AND BLUEPRINT READING FOR ELECTRICIANS**

Students are taught to solve realistic mathematical problems which may be encountered by the electrician in order to gain a solid foundation for a career in the electrical field. Students also learn blueprint reading with electrical symbols.

### **RCE 103 BASIC ELECTRICITY**

This course includes a presentation of atomic theory and theory of magnetism, direct current (DC) circuitry, Ohm's Law and its applications, and dry cell and wet cell batteries.

### **RCE 104 ELECTRICAL MEASURING DEVICES**

Students are taught the use of voltmeters, ohmmeters, ammeters, multimeters, and megohmmeters and their application to diagnostic troubleshooting. Students are taught the theoretical aspects and the installation of basic devices such as dimmers, compact, fluorescent lamps and LED lighting.

### **RCE 105 RESIDENTIAL WIRING SYSTEMS**

Limited only to basic single pole switches, 3-way and 4-way switches, and cell circuits. Students are taught all basic residential wiring circuits and troubleshooting used in a residential setting. Students install a 100-amp system with related circuitry in a simulated residence. Proper safety procedures are followed in accordance with the National Electrical Code (N.E.C.) guidelines including the correct size and use of conductors and circuit breakers. Students are taught the identification and care of tools used in the electrical trade. Students are taught how to install solar panels, interfaces, and other electrical components.

### **RCE 106 AC THEORY**

This course teaches the difference between direct current and alternating current and shows why alternating current (AC) is the basis of all transformers and electrical distribution systems.

### **RCE 107 ELECTRICAL MOTORS, CONTROLLERS, AND PLCs**

Students are taught how to install and troubleshoot motor control circuits. They learn to identify defective motors, transformers, contactors, and relays. They also are taught common motor control circuits for three-phase and single-phase motors. Students design and install Programmable Logic Controllers.

### **RCE 108 COMMERCIAL WIRING SYSTEMS**

This course deals with raceway installations used in commercial establishments.

### **PD 616 PROFESSIONAL DEVELOPMENT**

Students learn the skills employers require for positive work relationships and long-term employment. They include targeted workplace competencies: problem solving and other cognitive skills, oral communication skills, personal qualities, work ethic, and customer service, interpersonal and teamwork skills. Students also learn about the importance of professionalism on the jobsite and employer expectations. Employment Specialists teach students effective Internet, interviewing, and job search skills.