

## **AIRC 204**

### **Advanced HVAC Electricity**

3 Credits: (2 hours lecture, 2 hours lab)

Community College of Baltimore County  
Common Course Outline

#### **Description**

**AIRC 204 – Advanced HVAC Electricity:** explores motors, controls, and other electrical devices as applied in heating, ventilation, air conditioning, and refrigeration equipment. An overview of controls and circuits for heat pumps and the reading and interpretation of more complex electrical schematic diagrams for a variety of applications is provided. This course is designed for advanced students in heating, ventilation, air conditioning, and refrigeration, as well as related programs.

**Pre-requisites:** AIRC 104 or approval of the Program Coordinator

#### **Overall Course Objectives**

Upon completion of this course, students will be able to:

1. demonstrate safety procedures used while working with electrical circuits;
2. demonstrate knowledge of permanent split capacitor (PSC) electric motors and control circuit theory;
3. apply schematic diagrams to describe the operating sequence of standard HVAC equipment;
4. apply troubleshooting techniques used in the HVAC field;
5. operate test equipment used in the troubleshooting process;
6. perform circuit board diagnosis and replacement;
7. apply testing techniques for residential HVAC service;
8. perform communicating control system diagnosis;
9. inspect and/or replace an ECM motor;
10. repair or replace defective control components of HVAC systems;
11. repair or replace defective load components of HVAC systems;
12. find shorts, grounds, opens, and resistance problems in electrical and electronic circuits to determine needed repairs;
13. inspect and test power and ground circuits and connections to determine service or replacement as needed;
14. measure current flow in electrical and electronic circuits and components using an ammeter to determine needed repairs; and
15. measure available voltage and voltage drop in electrical and electronic circuits using a digital multimeter to determine needed repairs.

#### **Major Topics**

- I. Safety procedures
- II. Wiring and schematic diagrams
- III. Communicating control systems

The Common Course Outline (CCO) determines the essential nature of each course.

For more information, see your professor's syllabus.

- IV. Standard motor basics
- V. Electronically commutated motor basics
- VI. HVAC low voltage controls
- VII. Troubleshooting techniques
- VIII. Heat pump and air conditioner controls

### **Course Requirements**

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- Midterm exam
- 12 homework/lab assignments
- Final exam
- Attendance and active participation

### **Other Course Information**

This course includes a hands-on lab portion and a lab fee is required.

Date Revised: 12/7/2021