Common Course Outline
AIRC 224
Commercial Control Systems
3 Semester Hours

The Community College of Baltimore County

Description

AIRC 224 – 3 credits – Commercial Control Systems incorporates both theory and hands-on learning in the areas of electronic controls, pneumatic controls and direct digital control (DDC) systems as each applies to a Heating, Ventilating, and Air Conditioning (HVAC) system. Course work centers on system components, wiring diagrams, calibration and sequences of operation, problem analysis and troubleshooting, and installation methods. Students learn to program a complete building energy management system. Interactive instructional media is used in this course.

3 credits: 3 lecture hours per week
Prerequisites: AIRC 205, AIRC 210, ELEI 101, and ELEI 201 or approval of the program coordinator

Overall Course Objectives

Upon completion of this course the student will be able to:

1. relate pneumatic and electronic controls to several types of air moving systems;
2. describe the benefits of the preferred method of control for variable air volume (VAV) and multi-zone systems;
3. explain wiring diagrams involving pneumatic, electronic and DDC controls;
4. create a flow chart to show the sequence of operation of pneumatic and electronic controls, and DDC operation;
5. calculate the correct adjustments on both pneumatic and electronic receiver controllers using a prescribed reset ratio;
6. describe the advantages of pneumatic and electronic controls over traditional control methods;
7. explain the advantages of DDC and microprocessor based controls over traditional control methods;
8. explain the difference between a variety of sensors and transmitters;
9. demonstrate the proper installation, wiring, and programming of a building control system; and
10. analyze and troubleshoot control problems.

Major Topics

I. Air moving equipment controls
   a. VAV

b. Multi-zone applications

II. System Installation
   a. Wiring techniques
   b. Air line connections
   c. DDC communication bus

III. Control Principles
   a. Digital vs analog
   b. Controller components

IV. Control communications

V. Sensors and transmitters

VI. DDC and microprocessors

VII. Three phase power
   a. Wye and Delta configuration
   b. Overload protection

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member and will be provided on the first day of class.

The following will be required for this course:

1. Approved practical project or written paper
   If a written paper is assigned, the following will apply:
   a. Topic of the paper will be selected by the student and should relate to the subject material of the course.
   b. The paper should be six (6) to eight (8) pages in length, typewritten, and double-spaced. It should include in addition to the six (6) to eight (8) pages of text, an author and title page and bibliography utilizing a minimum of three reference resources excluding classroom materials.
   c. All papers are due when 80% of the class sessions are completed.
2. Midterm exam
3. Comprehensive final
4. Minimum of three (3) classroom assignments
5. Minimum of four (4) homework assignments
6. Class discussion and participation

Other Course Information

This is a Heating, Ventilating, Air Conditioning, and Energy program elective.