

AIRC 224

Commercial Control Systems

3 Credits (3 Lecture hours per week)

Community College of Baltimore County
Common Course Outline

Description

AIRC 224 – 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. Coursework 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.

Pre-requisites: AIRC 205, AIRC 210, ELEI 101, and ELEI 201 or approval of the program coordinator

Overall Course Objectives

Upon completion of this course, students 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

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For more information, see your professor's syllabus.

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

- Approved practical project or written paper
 - If a written paper is assigned, the following will apply:
 - Topic of the paper will be selected by the student and should relate to the subject material of the course
 - 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
 - All papers are due when 80% of the class sessions are completed
- Midterm exam
- Comprehensive final
- Minimum of three (3) classroom assignments
- Minimum of four (4) homework assignments
- Class discussion and participation

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

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

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