

Common Course Outline
AIRC 212
Energy Control Strategies
3 Semester Hours

The Community College of Baltimore County

Description

AIRC 212 – 3 Credits - Energy Control Strategies addresses all devices that are used to regulate energy use in buildings: from pneumatic to electric to electronic; from manual to automatic; from simple switches to microprocessors. An emphasis is placed on identifying and solving control calibration problems and improving energy efficiency through redesign and energy control strategies.

3 credits: 3 lecture hours

Prerequisites: AIRC 210, AIRC 205, ELEI 101 or approval of program coordinator

Overall Course Objectives

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

1. list, recognize, and describe the controls systems typically found in the commercial sector;
2. describe energy control strategies used in the commercial sector;
3. explain the basic principles of control system design;
4. describe wiring techniques for line voltage and low voltage systems;
5. describe issues to be addressed in the commissioning of an energy control system in a new building;
6. demonstrate entry-level technician skills to install, calibrate, troubleshoot, repair, and maintain energy control systems;
7. apply energy control strategies to a case study;
8. evaluate an energy control system for effectiveness based on its design functions;
9. discuss and examine future trends in energy control and job opportunities;
10. explain the relationship between energy controls and indoor air quality;
11. help create sequence of operation for building and process systems;
12. conduct basic energy control systems programming;
13. respond to alarms and occupant requests through the use of an energy management system;
14. develop project measurement and verification plan;
15. install and troubleshoot data acquisition equipment;
16. collect data for evaluation and verification;
17. select and operate testing equipment; and
18. interpret and comply with applicable codes and guidelines.

Major Topics

- I. Control loops
- II. Process diagrams

- III. Basic electrical control diagrams
- IV. Pneumatic control systems
- V. Electronic control systems
- VI. Air flow control
- VII. Proportional and programmable controllers
- VIII. Building automation systems
- IX. Energy control strategies
- X. Complete control systems
- XI. Commissioning maintenance and review
- XII. Future Trends

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. Written paper or suitable practical project
 - 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. A minimum of two (2) quizzes
5. A minimum of four (3) homework assignments
6. Lab/Simulation projects graded on time and accuracy

Other Course Information

This course is an Alternative Energy Certificate core course and a Heating, Ventilating, Air Conditioning, and Energy Technology program elective.

Individual faculty members may include additional course objectives, major topics, and other course requirements to the minimum expectations stated in the Common Course Outline.