

Common Course Outline

AIRC 223

Commercial HVAC Systems

3 Semester Hours

The Community College of Baltimore County

Description

AIRC 223 – 3 credits - Commercial HVAC Systems explores the technology used in commercial, institutional, and industrial cooling systems. Course work includes analysis of system performance and diagnosis of problems. Students examine equipment such as reciprocating and centrifugal chillers, absorption systems, cooling towers, fans and air handlers. Emphasis is placed on psychrometrics, pressure-enthalpy diagrams, and commercial load calculations.

3 credits: 3 lecture hours per week

Prerequisites: AIRC 205, AIRC 210, ELEI 101, and ELEI 201 or approval of program coordinator

Overall Course Objectives

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

1. identify the components of a large commercial cooling system;
2. describe the operation of a chiller/cooling tower/pump system;
3. relate psychrometrics, pressure-enthalpy diagrams, and commercial load calculations to commercial air conditioning processes;
4. explain the composition of acceptable air quality;
5. explain the relationship between pressure and temperature;
6. correlate the gas laws as they relate to HVAC;
7. explain the difference between conduction, convection, and radiation;
8. explain the effects of occupancy loads;
9. perform heat gain and loss calculations from prescribed plans using a calculation form or computer program;
10. calculate efficiency ratings of different cooling systems;
11. calculate costs of operation of systems with various efficiency ratings;
12. demonstrate methods of system charging;
13. analyze air and water vapor mixtures;
14. list the proper maintenance procedures for commercial cooling system applications; and
15. demonstrate the procedure for start up and operation of commercial systems.

Major Topics

- I. Human comfort
- II. Physical principles of heat

- III. Building heat loss and gain
- IV. Efficiency ratings
- V. Thermodynamics and the refrigeration cycle
- VI. System charging
- VII. System performance
- VIII. Psychrometrics
- IX. Compressors
- X. Condensers and cooling towers
- XI. Absorption systems

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 Technology program elective.