

III. Statement of Course Need

- A. Technicians in the Environmental Control Technology field are vital to maintaining physical comfort within commercial settings. Understanding the controls and instrumentation utilized in typical commercial comfort control systems are integral elements for the education of well-trained technicians in the Environmental Control Technology field.
- B. Extensive hands-on work in the form of laboratory activities is necessary to familiarize students with advanced electrical troubleshooting procedures and best-practices followed by professionals in the commercial HVAC Controls Field and expected of candidates that want to enter this field of work. Lab activities include, but are not limited to: tool/tester/instrument familiarization and proper use techniques; circuit component identification, assembly/disassembly, troubleshooting and repair procedures.
- C. This course generally transfers as a free elective, but it also serves as a Program Elective to Pennsylvania College of Technology for those students graduating with the AAS in Environmental Control Technology who are interested in pursuing B.S. degree at that institution.

IV. Place of Course in College Curriculum

- A. Free elective
- B. This course meets a program requirement for the A.A.S. Environmental Control Technology Program.
- C. Course transferability: a) for New Jersey schools go to the NJ Transfer website, www.njtransfer.org; b) For all other colleges and universities go to their individual sites.

V. Outline of Course Content

- A. Controls Fundamentals (Honeywell Commercial)
- B. Hydronic/Boiler controls for Commercial Applications (Honeywell Commercial, Weil McLain, Circuits Lab)
- C. Heat Pump Controls (Honeywell Control Pro)
- D. Air Handling and Building Airflow Systems Control Application (Honeywell Commercial)
- E. Psychrometrics and Economizer Training (Trane, Honeywell Commercial)
- F. Pneumatic Controls (Honeywell Commercial, Robertshaw/Siebe Controls)
- G. Electronic Control Fundamentals (Honeywell Commercial)
- H. Microprocessor-based/DDC Fundamentals (Honeywell Commercial)
- I. Chiller and Distribution System Control Applications

VI. General Education and Course Learning Outcomes

A. General Education Learning Outcomes

At the completion of the course, students will be able to:

1. identify appropriate techniques to solve problems specific to controls and instrumentation used with comfort control systems (GE - NJ 4).
2. apply quantitative reasoning to issues related to controls and instrumentation utilized with comfort control systems (GE - NJ 2).

B. Course Learning Outcomes

At the completion of the course, students will be able to:

1. Apply principles from manufacturer-specific literature to select pneumatic controls and accessories that best suit the needs of a particular HVAC comfort process
2. Sketch schematics in which pneumatic devices perform a variety of control functions
3. Identify how digital controllers could replace existing pneumatic controllers and how pneumatic, digital and electronic controls can work together in a hybrid system
4. Demonstrate proficiency in his/her understanding of Heat Pump operation

C. Assessment Instruments

The following assessment methods may be used:

1. Projects.
2. Exams.
3. Lab Performance.
4. Demonstrations.

VII. Grade Determinants

- A. Lab performance.
- B. Exams.
- C. Class participation.
- D. Projects.

Modes of Teaching and Learning used in the Course:

- A. Lecture/discussion.
- B. Small-group work.
- C. Laboratory work.
- D. Student collaboration.

VIII. Text and Materials

Suggested Text: Engineering Manual of Automatic Controls for Commercial Buildings, latest edition, Honeywell, Inc.

References: Handouts given by the instructor.

Please note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

IX. Resources

- A. Reference books
- B. Safety equipment
- C. Sample comfort control system components
- D. Instructional videos/DVDs
- E. Various environmental controls technology-shop tools and testers available in the lab.

X. Honors Option

Not applicable