

III. Statement of Course Need

- A. Technicians in the Environmental Control Technology field are vital to maintaining physical comfort within our residences. Understanding the structure, components and learning about troubleshooting techniques of typical refrigeration 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 service procedures and best-practice standards followed by professionals in the 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; system 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, and the Environmental Control Technology Certificate.
- 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. Hand Tools
- B. Mathematics for Technicians
- C. Fasteners
- D. Working with Copper Tubing
- E. Working with Pipe
- F. Soldering
- G. Brazing and flame-cutting
- H. Basic Thermodynamic Principles
- I. Temperature and Pressure
- J. Basic Refrigeration Cycle
- K. Other System Components
- L. Refrigerants
- M. Troubleshooting Refrigerant Problems
- N. Working with Refrigerant Controls

- O. Special Purpose Valves
- P. Troubleshooting flow controls
- Q. Compressors
- R. Compressor Lubrication and Accessories
- S. Introduction Chillers, Cooling Towers and Evaporative Condensers

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 troubleshooting techniques to solve problems with refrigeration equipment (GE - NJ 4).
2. Apply quantitative reasoning to determine and solve refrigeration issues (GE - NJ 2).

B. Course Learning Outcomes

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

1. Identify the proper use of hand tools, fasteners, pipe/tube fittings
2. Identify the main components of a refrigeration machine and their functions
3. Construct a refrigeration system
4. Analyze mechanical malfunctions in air conditioning and refrigeration equipment and develop service/troubleshooting skills

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: Heating and Cooling Essentials, Latest Edition, by Jerry & LaDonna Killinger

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/manuals
- B. Safety equipment
- C. Welding, brazing and flame-cutting equipment
- D. Sample refrigeration system components
- E. Instructional videos/DVDs
- F. Various environmental controls technology-shop tools and testers available in the lab.

X. Honors Option

Not applicable