

Virginia Western Community College
AIR 123
Air Conditioning & Refrigeration III

Prerequisites

AIR 122

Course Description

Psychrometric properties of air, heat load and gain calculations, heated and chilled water systems, duct, air distribution and comfort requirements. Part I of II. Lecture 2-3 hours. Laboratory 2-3 hours, total 4-6 hours per week.

Semester Credits: 3 Lecture Hours: 2 Lab/Clinical/Internship Hours: 2**Required Materials****Textbook:**

- **Modern Refrigeration, 20th edition, ISBN#: 9781631263545**
- Manual P, Psychometrics Theory and Applications, Copyright 2009 by Air Conditioning Contractors of America. ISBN: 9781892765086.
- Manual D, Residential Duct Systems, Copyright 2009 by Air Conditioning Contractors of America. ISBN: 9781892765505.

Other Required Materials:

None.

Course Outcomes**At the completion of this course, the student should be able to:**

- To obtain a working knowledge of the ACCA psychrometric chart, the properties and processes associated with it, as it relates to residential heating and cooling.
- Students will also learn to perform heat loss and gain calculations with HVAC Load Calc using a program on the VWCC school desktop PC.
- Ultimately by the end of the semester each student should have the ability to look at a basic residential floor plan and the accompanying specification sheets and apply the knowledge gained in the course to determine:
 - Heat loss and heat gain for a residential structure.
 - Appropriate equipment selection and sizing based on heat loss and heat gain calculations.
 - Size duct work for new installations in residential applications.

- The students will learn how to use the engineering data provided by the manufacturer of the equipment to determine the air flow in cubic feet per minute (CFM) required for the space as a whole; as well as, the CFM requirement for individual rooms and supply outlets which serve them.
- Based on these values students will study floor plans to determine guidelines for placement of supply and return branches and appropriate supply and return duct routing to maintain adequate airflow which will allow the system to operate safely, dependably and efficiently.
- Additionally the students will have the opportunity to design a system as a team and determine the fittings necessary to maneuver the duct as instructed, simulating an actual install in a residential structure.
- The students will also draw the necessary fittings, build, install, and test the system mathematically.

Topical Description

Week	Activity / Topic	Reference	
1	Syllabus	All Units	
2	Properties of air	Manual P	
3	Properties of air	Manual P	
4	Unit test		
5	HVAC Load calc	Manual J	
6	HVAC Load calc	Manual J	
7	HVAC Load calc	Manual J	
8	Midterm Test	All	
Week	Activity / Topic	Reference	
9	Equipment design	Handouts	
10	System Design	Handouts	
11	System Design	Handouts	
12	Unit test		
13	Duct design	Manual D	
14	Duct design	Manual D	
15	Total House design		
16	Final Test	All	

Notes to Instructors

None