

PHCC Educational Foundation
E-Learning
HVACR 301 Syllabus

Primary Course Contact

Maureen Vasquez

Email: vasquez@naphcc.org

Work Phone: 800-533-7694

Office Location: 180 S. Washington St., Ste. 100, Falls Church, VA 22046

Office Hours: 9:00 a.m. to 3:00 p.m. ET Tuesday through Thursday.

Prerequisites

HVACR 101 and 201 or equivalent

Welcome to the PHCC Educational Foundation's HVACR Online Apprenticeship-Related Instruction Program!

This program is designed to provide students who cannot attend classes in a traditional apprentice program with the same opportunity to learn the textbook fundamentals of the trade. This training course must be supplemented by your employer, through both technical assistance and on-the-job training in each area of instruction in the book.

Course Goals

- To provide a more in-depth understanding of servicing and troubleshooting HVACR systems
- To familiarize students with testing, adjusting and balancing techniques
- To introduce students to cooling towers and evaporative condensers
- To provide familiarize students with commercial air conditioning and refrigeration systems
- To introduce students to concepts of indoor air quality

Course Policies and Instructions

It is the student's responsibility to ensure that this course is an acceptable form of apprenticeship training in his/her state.

The student must complete the enrollment form and pay for the course before a program can be delivered.

To maintain continuity, it is recommended that at least one unit be completed and one test be submitted each month. **There is a maximum time limit of 12 months to complete the program.** Exceptions to the time limit may be made at the discretion of the Director of Apprentice & Journeyman Training.

The student is solely responsible for completing his or her work in a timely manner and for requesting any extensions for completing the course. Students who have not submitted a unit test

in 60 days will receive a warning notice by mail requiring them to complete a minimum of one unit test within 30 days to remain active in the program. Students failing to submit a unit test for 90 consecutive days will be dropped from the program. If the student is dropped from the program, the student forfeits all money paid for the program and receives no credit for the portion completed.

Students in good standing (with an average test grade of 70% or higher) dropped from the program may reinstate their registration and resume studies within 6 months of the date dropped by paying a \$100 reinstatement fee.

No refunds are available on this course.

All tests are closed-book and are taken on the honor system. Students are expected to submit original work at all times. Any answers on a test that are verbatim from the textbook will be marked incorrect and no credit will be given. Students violating this policy are subject to removal from the program at the discretion of the PHCC Educational Foundation. All students removed from the program are ineligible for refunds and may not be reinstated in the program under any circumstances.

On-the-job training must be coordinated with the student's employer. **On-the-job training is the responsibility of the apprentice and his/her sponsor.** The apprentice and employer are responsible for maintaining accurate records of on-the-job training and supplying those to the appropriate state apprenticeship agency as required in the state where the apprentice is registered.

Due to varying state requirements for licensing, students are limited to enrollment in one course per calendar year. Exceptions may be made on a case-by-case basis. Requests for waivers to this policy must be made in writing to: Merry Beth Hall, Director of Apprentice & Journeyman Training, PHCC Educational Foundation, 180 S. Washington St., Ste. 100, Falls Church, VA 22046.

Course Requirements & Grading

In order to successfully complete this course, each student must complete all assignments including:

- Reading assignments
- Three discussion board assignments
- One drawing assignment
- Eight unit tests
- One final exam

Online tests need instructor review and will be graded and returned within 7 days from the date submitted. In the case of tests or assignments with drawings, please allow up to 30 days for tests to be graded and returned. If you have not received your graded test within 30 days, please contact us at 800-533-7694 or by email at vasquez@naphcc.org.

Please note that online tests may show an answer as incorrect when it is actually correct. This occurs with fill in the blank and short answer questions. The software is not intuitive and

spelling errors or verbiage not exactly like the answer key trigger the software to mark an answer wrong when it is not. The instructor will review all tests to override the software errors so your grade is correct. Please allow up to 7 days from the date submitted for the instructor to review your test.

Students and their employers are responsible for maintaining records for on-the-job training as required by the state in which they are regulated. Upon request, the PHCC Educational Foundation will provide student progress reports on the home study (apprenticeship-related instruction) portion of the apprenticeship to the appropriate state licensing entity.

All assignments must be completed in order to finish and pass the course.

Students are required to achieve a passing grade of 70% on each test. In the case of a score lower than 70%, a test may be re-taken after the student reviews the unit again and is prepared to re-take the exam. Students must contact the instructor to re-take the exam (vasquez@naphcc.org) and must wait at least 10 days from the previous attempt before re-taking the exam.

A certificate of completion will be awarded for completion of the program with a minimum 70% grade.

Grades will be calculated based on a total of 400 possible points, meaning that a student must earn at least 280 points to successfully complete the course. However, please note above that students must score a 70% on each test in order to pass that component of the course. Unit tests are worth 25 points each, so 17.5 out of 25 must be scored in order to pass a unit test. Weighting of course assignments and tests is as follows:

Discussion board assignments (3) - 20 points each (60 points total)

Drawing assignment (1) - 40 points

Unit tests (8) - 25 points each (200 points total)

Final exam (1) - 100 points

Required Textbook

Hohman, John (2010). *HVACR 301*, 1st ed. Clifton Park, NY: Delmar, Cengage Learning.

Assignments

In order to stay on track for course completion within 12 months, students are expected to complete one unit per month.

Unit 1 - Servicing and Troubleshooting Systems and TAB

Read Chapters 1 and 2 in the *HVACR 301* textbook.

Optional: Scroll to the bottom of this page and click on the HVAC Troubleshooting Simulations courseware link. Review several troubleshooting scenarios related to those discussed in the textbook to increase your understanding of the material presented. A tutorial for accessing the system is attached at the top of this page.

Discussion Board Assignment #1: Discuss an alternative energy system solution that is gaining popularity in your area. What type of system is it? How does it work? How does it compare in cost to air-source or water-source heat pumps? What are the advantages and disadvantages of this alternative energy system solution? Go to the Discussion Board and enter the information requested in Assignment #1.

Test #1: Once you have studied the content of Chapters 1 and 2 and are prepared to take a test, you may take the Unit 1 Test by clicking on the link at the bottom of this page. Once you start the test, you may not leave it and come back later. You must complete it at that time. Make sure you have enough time to finish the test before starting it! Please note that each test in this course is a **closed-book test**. As with any academic program, it is expected that you will complete each test without any outside assistance. You are on the honor system.

Unit 2 - Energy-Efficient Mechanical Systems and Fluid Handling Systems

Read Chapters 3 and 4 in the *HVACR 301* textbook.

Video - [Circulators](#)

Test #2: Once you have studied the content for this unit and are prepared to take a test, you may take Unit Test 2 by clicking on the link at the bottom of this page. Again, this is a closed-book test and you may not receive any outside assistance to complete it.

Unit 3 - Applied Electrical Problem Solving

Read Chapter 5 in the *HVACR 301* textbook.

Video - [Arc Flash](#)

Optional: Log into the HVAC Troubleshooting Simulations software (link at bottom of this page). Use the Electricity for HVAC software and work through several scenarios in the 3-D Troubleshooting section of the software to reinforce understanding of the content from this chapter. A tutorial for accessing this software is attached at the top of this page.

Test #3: Once you have mastered the content of this unit and are prepared to take a test, click on the link below to take Unit Test 3. This is a closed-book test!

Unit 4 - Applied Refrigeration System Problem Solving

Read Chapter 6 in the *HVACR 301* textbook.

Optional: Log in to the HVAC Troubleshooting Simulations software package (below). Work through several scenarios in both the mechanical and electrical troubleshooting simulation packages to reinforce the topics covered in this chapter. A tutorial for accessing these packages is attached at the top of this page.

Discussion Board #2: Select one of the following systems: electrical system, controls, delivery system, or A/C and refrigeration systems. Discuss the commissioning checks done for the system you have chosen. Which checks are done with the power off and which are done with the power

on? Why is each specific check done? Be specific! Go to the Discussion Board and enter the information requested in Assignment #2.

Test #4: Once you are prepared for the test on this unit, click on the Unit 4 Test link at the bottom of this page. No outside assistance!

Unit 5 - Troubleshooting with the Psychrometric Chart

Read Chapter 7 in the *HVACR 301* textbook.

Drawing Assignment #1: Using the Drawing Assignment Answer Sheet and the Drawing Assignment Psychrometric Chart files at the top of this page, plot the points requested on the chart and fill in the blanks on the answer sheet. Submit your assignment to the instructor via email at vasquez@naphcc.org or by fax to 703-237-7442.

Test #5: Click the link at the bottom of this page to take Unit Test 5. Again, this is a closed-book test.

Unit 6 - Cooling Towers and Evaporative Condensers

Read Chapters 8 in the *HVACR 301* textbook.

Video - [Cooling Towers](#)

Discussion Board Assignment #3: Discuss (in your own words) the purpose, function, and basic operation of cooling towers. Are these systems used in your region? Why or why not? What are some applications in which you have seen these used? If you are not familiar with them, where might you find them in your area or why are they not used?

Test #6: Once you have mastered the content of this unit and are prepared to take a test, click the Unit 6 Test link at the bottom of this page. This is a closed-book test!

Unit 7 - Commercial Air Conditioning and Refrigeration Systems

Read Chapter 9 in the *HVACR 301* textbook.

Test #7: When you are prepared to take the Unit 7 Test, click on the link at the bottom of this page. As always, this is a closed-book test.

Unit 8 - Water Treatment and Indoor Air Quality

Read Chapters 10-11 in the *HVACR 301* textbook.

Video - [Legionella](#)

Video - [Sick Building Syndrome](#)

Test #8: Click the link below to complete the Unit 8 Test.

Final Exam

Review all of the previous units and tests. When you are prepared, click the link below to take the final exam.