

PHCC Educational Foundation
E-Learning
HVACR 401 Syllabus

Primary Course Contact

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

Prerequisites

HVACR 101, 201 and 301 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 familiarize students with heat pump systems and components
- To provide students with in-depth knowledge about air-source heat pumps
- To provide students with in-depth knowledge about geothermal heat pumps
- To introduce students to energy and efficiency calculations and applications

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
- Two discussion board assignments
- 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 (2) - 50 points each (100 points total)

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

Final exam (1) - 100 points

Required Textbook

Hohman, John (2012). *HVACR 401*, 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 - Review of Basic Refrigeration Related to Heat Pumps

Read Chapters 1 through 4 in the *HVACR 401* textbook.

Video - [Superheat](#)

Video - [Subcooling](#)

Test #1: Once you have studied the content of Chapters 1 through 4 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 - Heat Pump Components and Fundamentals

Read Chapters 5 through 9 in the *HVACR 401* textbook.

Video - [HVAC Motors](#)

Video - [Defrost Sequence](#)

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 - Electrical Schematics and Heat Pump Installation & Maintenance

Read Chapters 10 through 12 in the *HVACR 401* textbook.

Optional: Scroll down to the bottom of this page to the HVAC Troubleshooting Simulations software link. Click on it and go to the Electricity for HVAC simulation package. Review the wiring diagrams section of this software. A tutorial for accessing the 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 - Troubleshooting and Systems

Read Chapters 13-15 in the *HVACR 401* textbook.

Optional: Scroll down to the HVAC Troubleshooting Simulations software link and click on it. Review a variety of simulation scenarios on the HVAC Simulation (mechanical) and Electricity for HVAC packages. A tutorial for accessing the system is attached at the top of this page.

Discussion Board #1: Develop your own troubleshooting case study. Following the example of the case studies in the textbook, write a scenario in which you have done troubleshooting to solve a problem. If you made mistakes in the process, what were they? Go to the Discussion Board and enter the information requested in Assignment #1.

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 - Geothermal Systems

Read Chapters 16-18 in the *HVACR 401* textbook.

Video - [Geothermal Heat Pumps](#)

Discussion Board Assignment #2: Discuss (in your own words) the long-term advantages of geothermal heat pump systems. 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 #5: Click the link at the bottom of this page to take Unit Test 5. Again, this is a closed-book test.

Unit 6 - Pumps and System Checks

Read Chapters 19 and 20 in the *HVACR 401* textbook.

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 - Geothermal Installation and Maintenance

Read Chapters 21-22 in the *HVACR 401* 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 - Geothermal Troubleshooting and Energy Efficiency Calculations

Read Chapters 23-24 in the *HVACR 401* textbook.

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.