

**PHCC Educational Foundation**  
**E-Learning**  
**HVACR 101 Syllabus**

**Primary Course Contact**

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**Prerequisites**

None

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 practical introduction to the HVACR trade
- To familiarize entry-level students with a broad overview of fundamental topics in the HVACR industry
- To provide students with an understanding of energy efficiency concerns in the HVACR field
- To provide students with an understanding of the fundamentals of selling and customer service

**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](mailto: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](mailto: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 Textbooks**

Moravek, Joseph (2008). *HVACR 101*, 1st ed. Clifton Park, NY: Delmar, Cengage Learning.

American College of Emergency Physicians (2011). *First Aid Manual*, 4th ed. New York, NY: DK Publishing, Inc.

## **Assignments**

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

### **Unit 1 - Introduction to HVACR Concepts**

Read Chapters 1 and 2 in the *HVACR 101* textbook.

Discussion Board Assignment #1: Visit your local or state licensing board web site to find regulations pertinent to the HVACR trade in your area. Note what is required for an HVACR technician to practice his/her trade and what is required for a contractor to run a business. Go to

the Discussion Board and enter the information requested in Assignment #1 (specific instructions are on the Discussion Board page).

Video - [History of Air Conditioning](#)

Video - [Basic Refrigeration Cycle](#)

Video - [Soft Skills Part 1](#)

Video - [Soft Skills Part 2](#)

Article - [5 Minutes Early is On Time](#)

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 - First Aid & Safety**

Read Chapters 1-12 in the *First Aid Manual*. It is recommended that you attend a Red Cross first aid course in your area to ensure that you have hands-on experience with first aid.

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 - Basic Electricity**

Read Chapter 3 in the *HVACR 101* textbook.

Video - [Basic Electricity for HVAC](#)

Optional: Scroll to the bottom of this page and click on the HVAC Troubleshooting Simulations courseware link. Use the Electricity for HVAC Simulation portion of this courseware package to review Circuit Theory. A tutorial for using the courseware is attached at the top of this page to help you log in and use the courseware.

Drawing Assignment #1: Draw an air conditioning circuit that includes the compressor, condenser, indoor fan, thermostat, and control circuit. Label the components in abbreviated form. Submit your assignment to the instructor via email at [vasquez@naphcc.org](mailto:vasquez@naphcc.org) or by fax to 703-237-7442.

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 - Basic Thermodynamics**

Read Chapter 4 in the *HVACR 101* textbook.

Video - [Boyle's Law](#)

Video - [Charles' Law](#)

Video - [Dalton's Law](#)

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 - Basic Refrigeration Cycle**

Read Chapter 5 in the *HVACR 101* textbook.

Video - [Using the PT Chart](#)

Discussion Board #2: Select a component in the refrigeration cycle. Visit manufacturers' web sites to gather information on a particular model of that component. Discuss the applications for this model including its compatibility with specific systems and refrigerants, any ratings and specifications listed for this model, and other pertinent information that would assist a technician in determining whether this is the appropriate model to use in a particular situation. Go to the Discussion Board and enter the information requested in Assignment #2.

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 - Scheduled Maintenance & Systematic Problem Solving**

Read Chapters 6-7 in the *HVACR 101* textbook.

Discussion Board Assignment #3: Create your own case study. Discuss a time when you have used the troubleshooting process to solve a problem in the field following the systematic method of troubleshooting. Go to the Discussion Board and enter the information requested in Assignment #3.

Optional: Scroll down to the bottom of this page to the HVAC Troubleshooting Simulations courseware link. Use the Simulation HVAC portion of the software to practice systematic problem solving of some mechanical problems in different HVAC systems. A tutorial for using the system for the first time is attached above.

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 - Installation & Repair Methods**

Read Chapter 8 in the *HVACR 101* 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 - Energy Efficient Installation, Selling & Customer Service**

Read Chapters 9-10 in the *HVACR 101* textbook.

Video - [SEER, HSPF and AFUE](#)

Video - [Customer Service](#)

Optional: Log in to the HVAC Troubleshooting Simulations courseware link and click on the HVAC Simulations portion of the courseware. In it, you will find Soft Skills simulation/quizzes to test your knowledge.

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.