



### **Architectural Design and Construction**

<https://www.hccs.edu/programs/areas-of-study/construction-industry--manufacturing/heating-air-conditioning--refrigeration/>

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## **HART 1345: Gas & Electric Heating | Lecture | #10107**

FALL 2021 | 8 Weeks (8.23.2021- 10.17.2021)

Hybrid/Online | CE J.B. Whiteley room 106 | Tu-Th 6:00 p.m.-8:20 p.m.

3 Credit Hours | 80 hours per semester

### **Instructor Contact Information**

**Instructor:** Armando R. Villanueva

**Office:** Southeast Campus

**HCC Email:** [armando.villanueva@hccs.edu](mailto:armando.villanueva@hccs.edu)

**Office Phone:** 713-718-5284

**Office Hours:** M-R 9:30-10:45 a.m.

**Office Location:** Southeast WFB1 rm 202#14

Please feel free to contact me concerning any problems that you are experiencing in this course. Your performance in my class is very important to me. I am available to hear your concerns and just to discuss course topics.

### **Instructor's Preferred Method of Contact**

I will respond to emails within 24 hours Monday through Friday; I will reply to weekend messages on Monday mornings.

### **What's Exciting About This Course**

In this course you will study the procedures and principles used in servicing heating systems including gas furnaces and electric heating systems

### **My Personal Welcome**

Thank you for choosing my class. According to the US Department of Labor, the growing number of sophisticated climate-control systems is expected to increase demand for qualified HVACR technicians. Candidates familiar with computers and electronics, as well as those who have developed troubleshooting skills, will have the best job opportunities.

There are many career and job opportunities in HVAC. The technician may work for a community-based company (residential), in a commercial or industrial setting or for a manufacturer. Our faculty is therefore diverse and each instructor offers a different perspective to prepare you to be successful in the HVAC industry.

### **Prerequisites and/or Co-Requisites**

- HART 1301 Basic Electricity for HVAC
- HART 1307 Refrigeration Principles
- HART 1341 Residential Air Conditioning

## Eagle Online Canvas Learning Management System

This section will use [Eagle Online Canvas](https://eagleonline.hccs.edu) (<https://eagleonline.hccs.edu>) to supplement in-class assignments, exams, and activities.

HCCS Open Lab locations may be used to access the Internet and Eagle Online Canvas. It is recommended that you **USE FIREFOX OR CHROME AS YOUR BROWSER.**

### HCC Online Information and Policies

Here is the link to information about HCC Online classes including the required Online Orientation for all fully online classes: <http://www.hccs.edu/online/>

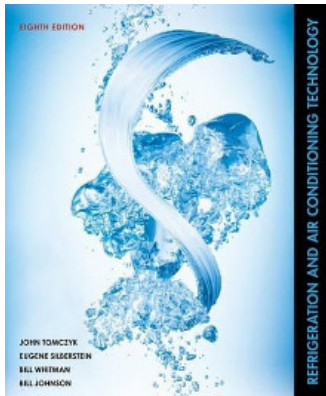
### Scoring Rubrics, Sample Assignments, etc.

Look in Eagle Online Canvas for the scoring rubrics for assignments, samples of class assignments, and other information to assist you in the course.

<https://eagleonline.hccs.edu/login/ldap>

## Instructional Materials

### Textbook Information



Refrigeration and Air Conditioning Technology  
8<sup>th</sup> Edition  
Whitman, Johnson, Silberstein, Tomczyk  
ISBN-13:978-1-305-57829-6

### Temporary Free Access to E-Book

N/A

### Other Instructional Resources

#### Publisher's Digital Workbook

N/A

#### Tutoring

HCC provides free, confidential, and convenient academic support, including writing critiques, to HCC students in an online environment and on campus. Tutoring is provided by HCC personnel in order to ensure that it is contextual and appropriate. Visit the [HCC Tutoring Services](#) website for services provided.

## Libraries

The HCC Library System consists of 9 libraries and 6 Electronic Resource Centers (ERCs) that are inviting places to study and collaborate on projects. Librarians are available both at the libraries and online to show you how to locate and use the resources you need. The libraries maintain a large selection of electronic resources as well as collections of books, magazines, newspapers, and audiovisual materials. The portal to all libraries' resources and services is the HCCS library web page at <http://library.hccs.edu>.

## Supplementary Instruction

Supplemental Instruction is an academic enrichment and support program that uses peer-assisted study sessions to improve student retention and success in historically difficult courses. Peer Support is provided by students who have already succeeded in completion of the specified course, and who earned a grade of A or B. Find details at <http://www.hccs.edu/resources-for/current-students/supplemental-instruction/>.

## Course Overview

In this course you will study the procedures and principles used in servicing heating systems including gas fired furnaces and electric heating systems.

### Core Curriculum Objectives (CCOs)

HART 1345 satisfies the design of the Heating, Air Conditioning and Refrigeration program requirement in the HCCS core curriculum. The HCCS Heating, Air Conditioning and Refrigeration Discipline Committee has specified that the course address the following core objectives:

- **Critical Thinking:** Students will demonstrate the ability to engage in inquiry and analysis, evaluation and synthesis of information, and creative thinking by completing a written assignment such as a book report, research paper, or essay.
- **Communication Skills:** Students will demonstrate effective development, interpretation and expression of ideas through written, oral, and visual communication by completing a written assignment such as a book report, research paper, or essay.
- **Quantitative and Empirical Literacy:** Students will demonstrate the ability to draw conclusions based on the systematic analysis of topics using observation, experiment, and/or numerical skills by completing textbook reading assignments, completing assignments, and answering questions on quizzes and exams that pertain to Course Student Learning Outcome #2 below.
- **Social Responsibility:** Students will demonstrate cultural self-awareness, intercultural competency, civil knowledge, and the ability to engage effectively in regional, national, and global communities by completing textbook reading assignments, completing assignments, and answering questions on quizzes and exams that pertain to Course Student Learning Outcome #4 below.

### Program Student Learning Outcomes (PSLOs)

Can be found at:

<https://www.hccs.edu/programs/areas-of-study/construction-industry--manufacturing/heating-air-conditioning--refrigeration/>

## Course Student Learning Outcomes (CSLOs)

Upon completion of HART 1345, the student will be able to:

1. Demonstrate knowledge of safety rules and regulations.
2. Demonstrate the proper selection, use, and maintenance of hand and power tools and measuring instruments used in the HVAC and Refrigeration.
3. Demonstrate knowledge of HVAC and refrigeration controls.
4. Maintain/service/repair HVAC and Refrigeration equipment
5. Troubleshoot HVAC and Refrigeration equipment.

### Learning Objectives

In this course, the learning objectives for each CSLO are:

1. Discuss concepts of heating
  - a. Describe the heat transfer process
2. Discuss combustion
  - a. Identify gas fuels and their combustion characteristics
3. Explain use of gas furnaces in residential heating
  - a. Describe the types of gas furnaces and how they operate
  - b. Identify and describe the equipment and controls used in gas furnaces
  - c. Describe the basic installation and maintenance requirements for hydronic systems.
4. Describe hydronic heating systems
  - a. Describe how hydronic systems operate
  - b. Identify and describe the equipment and controls used in hydronic systems
  - c. Describe the basic installation and maintenance requirements for hydronic systems
5. Describe electric heating systems
  - a. Describe how electric systems operate
  - b. Identify and describe the equipment and controls used in electric systems
  - c. Describe the basic installation and maintenance requirements for electric systems

## Student Success

Expect to spend at least twice as many hours per week outside of class as you do in class studying the course content. Additional time will be required for written assignments. The assignments provided will help you use your study hours wisely. Successful completion of this course requires a combination of the following:

- Reading the textbook
- Attending class in person and/or online
- Completing assignments
- Participating in class activities

There is no short cut for success in this course; it requires reading (and probably re-reading) and studying the material using the course objectives as your guide.

## Instructor and Student Responsibilities

As your Instructor, it is my responsibility to:

- Provide the grading scale and detailed grading formula explaining how student grades are to be derived

- Facilitate an effective learning environment through learner-centered instructional techniques
- Provide a description of any special projects or assignments
- Inform students of policies such as attendance, withdrawal, tardiness, and make up
- Provide the course outline and class calendar which will include a description of any special projects or assignments
- Arrange to meet with individual students before and after class as required

As a student, it is your responsibility to:

- Attend class in person and/or online
- Participate actively by reviewing course material, interacting with classmates, and responding promptly in your communication with me
- Read and comprehend the textbook
- Complete the required assignments and exams
- Ask for help when there is a question or problem
- Keep copies of all paperwork, including this syllabus, handouts, and all assignments
- Attain a raw score of at least 50% on the departmental final exam
- Be aware of and comply with academic honesty policies in the HCCS Student Handbook
- <https://www.hccs.edu/resources-for/current-students/student-handbook/>

## **Assignments, Exams, and Activities**

### **Written Assignment**

At least one written assignment is required. The written assignment(s) should be clearly linked to the course student learning outcomes and learning objectives. Written assignment(s) must count at least 15% of students' course grades or a minimum of 150 points on a 1,000-point scale (see Grading Formula below).

### **Exams**

Insert a specific description of your exams. Include the number and types of questions, such as "50 multiple-choice questions." You must also state how much each question counts and how much each exam counts toward students' course grades. If your exams are on Eagle Online Canvas, advise students of the dates of availability of each exam, the time limit, if any, and the number of attempts allowed. HCC does not provide students with Scantron forms. They are sold in campus bookstores.

### **In-Class Activities**

You may choose to include in-class activities. If so, specify the types of activities student should expect, such as quizzes, participation in activities during class, projects, etc.

### **Final Exam**

All students will be required to take a comprehensive departmental final exam consisting of 100 multiple-choice questions. Students must provide their own Scantron forms (FORM

NUMBER 882-E-LOVAS). All the information students need to prepare for the exam is in the [Final Exam Handbook](#).

You must get at least 50% (50 of 100) of the items correct on the final to pass the course (departmental decision). Students who are absent from the final exam without discussing their absence with the instructor in advance or within 24 hours afterward will receive a course grade of Incomplete. Any student who does not take a makeup exam by the end of the following long semester will receive a final exam grade of zero and a course grade of F.

## Grading Formula

### Student Evaluation Policies/Grading Scales

Class Participation	220	22%
Assignments	240	24%
Exam 1	120	12%
Exam 2	120	12%
Midterm Examination	150	15%
Final Examination	150	15%
Total Possible Points	1000 -	
Total Percentage		- 100%

<b>Grade</b>	<b>Total Points</b>
A	90-100 <b>Excellent</b>
B	80-89 <b>Good</b>
C	70-79 <b>Fair</b>
D	60-69 <b>Passing</b>
F	<60 <b>Failing</b>
FX	<b>Failing due to non-attendance</b>
IP	<b>In Progress</b>
W	<b>Withdrawn</b>
I	<b>Incomplete</b>
AUD	<b>Audit</b>
IP	<b>In Progress. Given only certain developmental course. A student must re-enroll to receive credit.</b>
COM	<b>Completed. Given in non-credit and continuing education courses.</b>

HCC Grading Scale can be found on this site under Academic Information:  
<http://www.hccs.edu/resources-for/current-students/student-handbook/>

## Course Calendar

Week	Dates	Topic/What's due
1	8/24-26/2021	Syllabus Unit 5: Tools and Equipment
2	8/30, 9/2/2021	Unit 13: Introduction to Automatic Controls Exam 1
3	9/7, 9/2021	Unit 14: Automatic Controls Components & Application
4	9/14, 16/2021	Unit 15: Troubleshooting Basic Controls Midterm Exam
5	9/21, 23/ 2021	Unit 30: Electric Heat
6	9/28, 30/2021	Unit 31: Gas Heat Exam 2
7	10/5, 7/2021	Unit 33: Hydronic Heat
8	10/12, 14/2021	Review: Final Exam

### Syllabus Modifications

The instructor reserves the right to modify the syllabus at any time during the semester and will promptly notify students in writing, typically by e-mail, of any such changes.

## Instructor's Practices and Procedures

### Missed Assignments

Any missed assignment can be accepted at a later date provided that the instructor is aware of your situation for missed assignments. Only a one-to-one basis will make-up work be considered. No make-up assignment will be accepted without the knowledge of the instructor.

### Academic Integrity

All students in this class will be expected to conduct themselves in accordance to HCC academic integrity. Failure to abide by the HCC Academic integrity policies and procedure such as cheating, plagiarism, collusion, etc. will result in severe consequences. Scholastic Dishonesty will result in a referral to the Dean of Student Services. See the link below for details.

Here's the link to the HCC information about academic integrity (Scholastic Dishonesty and Violation of Academic Scholastic Dishonesty and Grievance):

<http://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-procedures/>

### Attendance Procedures

The HCC attendance policy should be abided by all students. Students are encouraged to get information from the class Syllabus on what will be covered or from a colleague. HCC is concerned about student success. Expect an "early alert" to be issued if there is excessive absenteeism.

### Student Conduct

Students are expected to abide by all HCC policies at all times. Mutual respect is expected in the classroom failure to abide by the HCC policies will result in severe consequences that will be implemented for disruptive behavior.

### Instructor's Course-Specific Information (As Needed)

Any questions concerning this course must be communicated to the instructor on a one-to-one basis. For example, include a student's grading policy describing when students can expect grades and feedback after they submit coursework.

### Electronic Devices

Electronic can disrupt the learning environment. Do **not** use electronic devices while class is in session. Breaks are typically provided. In the event of an emergency, please exit the classroom if you must conduct business or tend to a personal matter using an electronic device. Calculators are permitted in the classroom, a cellular/mobile phone is **NOT** allowed to be used as a calculator.

### Architecture Design & Construction Program Information

<https://www.hccs.edu/programs/areas-of-study/construction-industry--manufacturing/>

### HCC Policies

Here's the link to the HCC Student Handbook <http://www.hccs.edu/resources-for/current-students/student-handbook/> In it you will find information about the following:

Academic Information	Incomplete Grades
Academic Support	International Student Services
Attendance, Repeating Courses, and Withdrawal	Health Awareness
Career Planning and Job Search	Libraries/Bookstore
Childcare	Police Services & Campus Safety
disAbility Support Services	Student Life at HCC
Electronic Devices	Student Rights and Responsibilities
Equal Educational Opportunity	Student Services
Financial Aid TV (FATV)	Testing
General Student Complaints	Transfer Planning
Grade of FX	Veteran Services

### EGLS<sup>3</sup>

The EGLS<sup>3</sup> (Evaluation for Greater Learning Student Survey System) will be available for most courses near the end of the term until finals start. This brief survey will give invaluable information to your faculty about their teaching. Results are anonymous and will be available to faculty and division chairs after the end of the term. EGLS<sup>3</sup> surveys are only available for the Fall and Spring semesters. -EGLS3 surveys are not offered during the Summer semester due to logistical constraints.

<http://www.hccs.edu/resources-for/current-students/egls3-evaluate-your-professors/>

### Campus Carry Link

Here's the link to the HCC information about Campus Carry:

<http://www.hccs.edu/departments/police/campus-carry/>



## HCC Email Policy

When communicating via email, HCC requires students to communicate only through the HCC email system to protect your privacy. If you have not activated your HCC student email account, you can go [to HCC Eagle ID](#) and activate it now. You may also use Canvas Inbox to communicate.

## Housing and Food Assistance for Students

Any student who faces challenges securing their foods or housing and believes this may affect their performance in the course is urged to contact the Dean of Students at their college for support. Furthermore, please notify the professor if you are comfortable in doing so.

This will enable HCC to provide any resources that HCC may possess.

## Office of Institutional Equity

Use the link below to access the HCC Office of Institutional Equity, Inclusion, and Engagement (<http://www.hccs.edu/departments/institutional-equity/>)

## disAbility Services

HCC strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please meet with a campus Abilities Counselor as soon as possible in order to establish reasonable accommodations. Reasonable accommodations are established through an interactive process between you, your instructor(s) and Ability Services. It is the policy and practice of HCC to create inclusive and accessible learning environments consistent with federal and state law. For more information, please go to <http://www.hccs.edu/support-services/disability-services/>

## Title IX

Houston Community College is committed to cultivating an environment free from inappropriate conduct of a sexual or gender-based nature including sex discrimination, sexual assault, sexual harassment, and sexual violence. Sex discrimination includes all forms of sexual and gender-based misconduct and violates an individual's fundamental rights and personal dignity. Title IX prohibits discrimination on the basis of sex-including pregnancy and parental status in educational programs and activities. If you require an accommodation due to pregnancy please contact an Abilities Services Counselor. The Director of EEO/Compliance is designated as the Title IX Coordinator and Section 504 Coordinator. All inquiries concerning HCC policies, compliance with applicable laws, statutes, and regulations (such as Title VI, Title IX, and Section 504), and complaints may be directed to:

David Cross  
Director EEO/Compliance  
Office of Institutional Equity & Diversity  
3100 Main  
(713) 718-8271  
Houston, TX 77266-7517 or [Institutional.Equity@hccs.edu](mailto:Institutional.Equity@hccs.edu)  
<http://www.hccs.edu/departments/institutional-equity/title-ix-know-your-rights/>

## **Office of the Dean of Students**

Contact the office of the Dean of Students to seek assistance in determining the correct complaint procedure to follow or to identify the appropriate academic dean or supervisor for informal resolution of complaints.

<https://www.hccs.edu/about-hcc/procedures/student-rights-policies--procedures/student-complaints/speak-with-the-dean-of-students/>

## **Department Chair Contact Information**

Aurelio Jesus Aguilar  
Houston Community College, Central Campus  
Construction Technology Faculty  
(713) 718-6549