



## INSTRUCTIONAL PACKAGE

ACR 210

Heat Pumps

FALL 2017

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## PART I: COURSE INFORMATION

Effective Term: FALL 2017

COURSE PREFIX: ACR 210

COURSE TITLE: Heat Pumps

CONTACT HOURS: 8

CREDIT HOURS: 4

### RATIONALE FOR THE COURSE:

This course is designed to provide the student with an advanced understanding of heat pump system design, installation and repair. This course incorporates all of the student skills and knowledge gained throughout the program.

### COURSE DESCRIPTION:

This course is a study of theory and operational principles of the heat pump.

### PREREQUISITES/CO-REQUISITES:

Credit level [ACR 118](#) Minimum Grade of C and Credit level [ACR 140](#) Minimum Grade of C

### REQUIRED MATERIALS:

**Fundamentals of HVACR; Lab Manual for Fundamentals of HVACR;**

**MyHVACLab with Pearson eText Access Card 3rd Edition**

**PUBLISHER: PEARSON**

**ISBN: 9780134512051**

Please visit the Bookstore online site for most current textbook information. Use the direct link below to find textbooks.

[BOOKSTORE](#).

Enter the semester, course prefix, number and section when prompted and you will be linked to the correct textbook.

### ADDITIONAL REQUIREMENTS:

HVAC/R toolkit available at the bookstore

### TECHNICAL REQUIREMENTS:

Access to Desire2Learn (D2L), HGTC's student portal for course materials.

WaveNet and D2L email access.

### CLASSROOM ETIQUETTE:

As a matter of courtesy to other students and your professor, please turn off cell phones and other communication/entertainment devices before class begins. If you are monitoring for an emergency, please notify your professor prior to class and switch cell phone ringers to vibrate.

## Part II: Student Learning Outcomes

### **COURSE LEARNING OUTCOMES and ASSESSMENTS\*:**

After this course of study the student should be able to:

- Define psychrometrics and plot on a psychrometric chart
- Describe how humidity affects equipment pressures and temperatures
- Describe the effects of various conditions on the evaporator and condenser
- Diagnose refrigerant, mechanical and electrical problems
- Describe a reverse cycle heat pump refrigerant system
- Test the function of various heat pump defrost systems
- Acquire the EPA 608 Type II certification
- Pass the HVAC Industry Competency Exam (ICE)

### **Tests**

Unit tests and lab tests are used to assess knowledge and skills. Make up tests and labs will be given at the instructor's convenience. It is the **responsibility of the student** to arrange with the instructor a time to make up a test. Cell phone use during a test is considered cheating.

### **Topics of study**

The following topics will be studied and discussed in detail, although the order of presentation may not exactly follow the attached listing. The instructor may introduce additional materials.

- Unit 42 – Fundamentals of Psychrometrics
- Unit 64 – Heat Pump System Fundamentals
- Unit 65 – Air source Heat Pump Applications
- Unit 68 – Troubleshooting Heat Pump Systems
- Unit 66 – Geothermal Heat Pumps
- Unit 67 – Heat Pump Installation
- Unit 89 – Installation Techniques
- Unit 90 – Planned Maintenance
- Unit 92 – Troubleshooting

### **Labs**

Lab work is a key element to having a working knowledge of the materials being presented in this course. Students must demonstrate adequate skills and procedures to be given a passing grade. Labs will be assigned based on equipment and space availability. Labs are assigned with an objective and deadline. While some labs are practiced in groups, lab grades are based on an individual's achievement.

### **Safety**

**Students will be expected to perform hands-on lab projects. These projects could stain or damage clothing. We recommend students to wear "work" clothes in the lab. No open toed shoes (sandals) allowed in the lab. Safety glasses, gloves or any other personal protection**

equipment (PPE) is to be worn when appropriate and provided by the student. No horseplay anywhere on campus.

*\*Students – please refer to the Instructor’s Course Information sheet for specific information on assessments and due dates*

### **Part III: Grading and Assessment**

#### **EVALUATION OF REQUIRED COURSE MEASURES/ARTIFACTS\***

Students’ performance will be assessed and the weight associated with the various measures/artifacts are listed below.

#### **EPA 608 TEST**

**Type II certification is required to complete this course.** All students who don’t possess the Type II certification will take the test. The EPA test makes up 20% of this course’s final average. The EPA grade is calculated as follows: Universal Certification (100%); Core, Type II with Type I or III (85%); Core and Type II only (70%).

#### **HVAC INDUSTRY COMPETENCY EXAM (ICE)**

An average of the four highest scores from the different sections of the ICE exam will count as 25% of this course’s final average. This is considered the final exam grade.

#### **EVALUATION\***

Tests	25%
Labs	25%
Homework	10%
EPA 608 Exam	20%
<u>ICE Exam</u>	<u>20%</u>
	100%

*\*Students, for the specific number and type of evaluations, please refer to the Instructor’s Course Information Sheet.*

#### **GRADING SYSTEM:**

State the College’s or departmental grading system as delineated in the Catalog. Please note the College adheres to a 10 point grading scale A = 100 – 90, B = 89- 80, C = 79 – 70, D = 69 – 60, F = 59 and below. You must have your Dean’s approval if changes in the scale are made.

Grades earned in courses impact academic progression and financial aid status. Before withdrawing from a course, be sure to talk with your instructor and financial aid counselor about the implications of that course of action. D’s, F’s, W’s, WF’s and I’s also negatively impact academic progression and financial aid status.

The Add/Drop Period is the first 5 days of the semester for **full term** classes. Add/Drop periods are shorter for accelerated format courses. Please refer to the academic calendar for deadlines

for add/drop ([ACADEMIC CALENDAR](#)). You must attend at least one meeting of all of your classes during that period. If you do not, you will be dropped from the course(s) and your Financial Aid will be reduced accordingly.

## Part IV: Attendance

Horry-Georgetown Technical College maintains a general attendance policy requiring students to be present for a minimum of eighty percent (80%) of his or her classes in order to be eligible to receive credit for any course. However, due to the varied nature of courses taught at the College, a more rigid attendance policy may be required by individual instructors. At a minimum, a student may be withdrawn from a course(s) after he or she has been absent in excess of ten percent (10%) of the total contact hours for a course. **Instructors define absentee limits for their class at the beginning of each term; please refer to the Instructor Course Information Sheet.**

## Part V: Student Resources

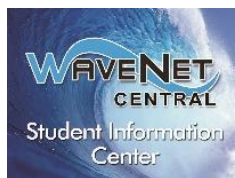


### The Student Success and Tutoring Center (SSTC)

The SSTC offers to all students the following **free** resources:

1. **Academic coaches** for most subject areas, **Writing Center Support**, and **college success skills**.
2. **On-line student success and academic support resources**.

Visit the SSTC website: [Student Success & Tutoring Center](#) and visit the student services tab in your WaveNet account to schedule appointments using TutorTrac. For more information, call: SSTC Conway, 349-7872; SSTC Grand Strand, 477-2113; and SSTC Georgetown, 520-1455. Room locations and Live Chat is available on the SSTC website.



### Student Information Center: WaveNet Central (WNC)

WNC offers to all students the following **free** resources:

1. **Getting around HGTC**: General information and guidance for enrollment!
2. Use the [Online Resource Center \(ORC\)](#) for COMPASS support, technology education, and online tools.
3. **Drop-in technology support or scheduled training** in the Center or in class.
4. **In-person workshops, online tutorials and more services** are available.

Visit the WNC website: [Wavenet Central](#). Live Chat and Center locations are posted on the website. Or please call one of the following locations: WNC Conway, 349-5182; WNC Grand Strand, 477-2076; and WNC Georgetown, 520-1473.

The **Instructor Information Sheet** will have more details on test requirements for your course.

## Disability Services

HGTC is committed to providing an accessible environment for students with disabilities. Inquiries may be directed to Jocelyn Williams, Director of Student Development on the Conway Campus Jaime Davis, Counselor/Advisor on the Georgetown Campus or Kristin Griffin, Counselor on the Grand Strand Campus. These individuals will review documentation of the student's disability and, in a confidential setting with the student, develop an educational accommodation plan.

Note: It is the student's responsibility to self-identify as needing accommodations and to provide acceptable documentation. After a student has self-identified and submitted documentation of a disability, accommodations may be determined, accepted, and provided.

## Title IX Requirements

The South Carolina Technical College System does not discriminate on the basis of race, color, gender, national or ethnic origin, age, religion, disability, marital status, veteran status, sexual orientation, gender identity, or pregnancy in educational programs and activities as required by Title IX. As outlined in the Violence Against Women Act, Horry Georgetown Technical College prohibits the offenses of domestic violence, dating violence, sexual assault, and stalking. Students who believe he or she has experienced or witnessed discrimination including sexual harassment, domestic violence, dating violence, sexual assault or stalking are encouraged to report such incidents to the Title IX Coordinators:

Dr. Melissa Batten, AVP of Student Affairs  
Building 1100, Room 107A, Conway Campus  
843-349-5228  
[Melissa.Batten@hgtc.edu](mailto:Melissa.Batten@hgtc.edu)

Jacquelyne Snyder, AVP of Human Resources  
Building 200, Room 212A, Conway Campus  
843-349-5212  
[Jacquelyne.Snyder@hgtc.edu](mailto:Jacquelyne.Snyder@hgtc.edu)

\*Faculty and Staff are required to report incidents to the Title IX Coordinators when involving students. The only HGTC employees exempt from mandatory reporting are licensed mental health professionals (only as part of their job description such as counseling services).