## Course Information

<table>
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<th>Course</th>
<th>Instructor</th>
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<td>Heat Pumps</td>
<td>Stephen Pape</td>
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**Fall 2015**

HART 2449 -31711 (4 Credit Hours)

Night Class 6:00 PM-10:15PM (31711)

### Required Materials:

1. **Refrigeration and Air Conditioning Technology 7th Edition**, by Whitman and Johnson
   - (Student may use 6th Edition ONLY if already purchased for Prerequisite Course).

   **AND**

   - ISBN:9780132319706

3. Three ring binder, Calculator, Flash Drive, Highlighters

4. Designated Hand Tools from all previous courses.

**Note: A minimum of 9 hours per week should be devoted to course material outside of class time**

### Course Prerequisites:

1. HART 1401 Basic electricity, and
2. HART 1403 Air Conditioning Control Principles, and
3. Hart 1407 Refrigeration Principles, and
4. HART 1441, Residential Air Conditioning, and
5. HART 1445 Gas and Electric Heating, OR, Consent of Instructor.

### Instructor Information

**SPape@dcccd.edu**

972-860-8192 Department Office


Department Office

Night Class 6:00 PM-10:15PM (31711)

### Course Description:

Studies of heat pumps, heat pump control circuits, defrost controls, auxiliary heat, air flow, and other topics related to heat pump systems.

Course will include interaction and instruction that will only be available on E-Campus. Students will need to check the E-Campus website on a regular basis and may be required to submit assignments in typed PDF Acrobat or DOC Word formats. **Students with computer deficiencies will need to contact the instructor for assistance navigating E-Campus at the beginning of the course.**

**Disclaimer** –
The instructor reserves the right to amend this syllabus as necessary.
Texas Core Objectives for Student Learning

Students will develop the essential knowledge and skills they need to be successful in college, in a career, in their communities, and in life. In this course, the following skills are in focus.

1. **Critical Thinking Skills** - to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information
2. **Communication Skills** - to include effective development, interpretation and expression of ideas through written, oral and visual communication
3. **Empirical and Quantitative Skills** - to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions
4. **Teamwork** - to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal
5. **Personal Responsibility** - to include the ability to connect choices, actions and consequences to ethical decision-making
6. **Social Responsibility**: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

**Student Learning Objectives:** Demonstrate understanding of Unit 1 & Unit 2 Topics and Components.

**UNIT 1**

1. **Refrigeration cycle components**
   
   Compressors  
   Indoor coils  
   Outdoor coils  
   Metering Devices  
   Check valves  
   Accumulators  
   Refrigerant Lines  
   Filter dryers  
   Reversing valves  
   Mufflers  
   Refrigerant Charge Compensators  
   Refrigerants  
   Lubricants  

2. Refrigeration cycle operation - Cooling
3. Refrigeration cycle operation – Heating
4. Refrigeration cycle operation – Defrost
5. Troubleshooting the refrigerant cycle – Cooling
6. Troubleshooting the refrigerant cycle – Heating
7. Troubleshooting the refrigerant cycle – Defrost
8. Refrigerant Charging – Cooling
9. Refrigerant Charging – Heating
10. Seasonal Energy Efficiency Rating (SEER)
11. Coefficient of Performance (COP)
12. Heating Season Performance Factor (HSPF)
13. Balance Point
15. Importance of Psychometrics

UNIT 2

1. Electrical Components
   - Compressors
   - Fan motors
   - Reversing valves
   - Thermostats
   - Defrost controls
   - Defrost relays
   - Defrost termination thermostats
   - Outdoor ambient thermostats
   - Heating elements
   - Sequencers
   - Watt restrictors

2. Trace electrical circuits – Cooling
3. Trace electrical circuits – First stage heating
4. Trace electrical circuits – Second stage heating
5. Trace electrical circuits – Emergency heat
6. Trace electrical circuits – Defrost
7. Troubleshooting electrical components
8. Troubleshooting electrical circuits – Cooling
9. Troubleshooting electrical circuits – Heating
10. Troubleshooting electrical circuits – Defrost
11. Troubleshooting electrical circuits – emergency heat
12. Remove/install electrical components
Outcomes: Student is expected to demonstrate mastery of Unit 1 & Unit 2 topics.

Exams and Assignments
1. Two Major Exams will be given at 200 points each.
2. Laboratory Work is worth 400 points
3. Homework is worth 100 points
4. Pop tests are worth a total of 100 points

Evaluation Procedures
The above points will be tallied with a maximum score of 1000 points for the semester (Plus Bonus Points detailed below). Letter grades will be assigned according to the standard procedure detailed below.

Grading Scale
Your performance objectives and exams will be translated to points and the points to grades. There are 1000 possible points and grades will be earned as follows:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Points</th>
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<tbody>
<tr>
<td>A</td>
<td>900 - 1000 Points</td>
</tr>
<tr>
<td>B</td>
<td>800 - 899 Points</td>
</tr>
<tr>
<td>C</td>
<td>700 – 799 Points</td>
</tr>
<tr>
<td>D</td>
<td>600 – 699 Points</td>
</tr>
<tr>
<td>F</td>
<td>Below 600 points</td>
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1. Major Exams 2 at 200 points each = 400 points
2. Laboratory 400 points
3. Homework 100 points
4. Pop test 100 points

Bonus Options
An additional 50 bonus points can be earned by using the tutoring services provided by the Air conditioning Program.

An Exam will be give at the end of the two units in the syllabus. You cannot “make-up” exams unless you have made specific arrangements before the scheduled exam.
Laboratory assignments are in the Laboratory Book. You are expected to complete every laboratory. At the end of each laboratory the laboratory instructor will evaluate your performance according to the following grading system.

Highly Proficient = 4, Competent = 3, Partially Proficient = 2, Extremely Limited = 1, Not Competent = 0.
Laboratories can be repeated until a grade of Competent or Highly Proficient is achieved.

Notebooks should be maintained on a daily basis. You are expected to write neatly and keep them well organized.

Separate sections in your notebook should be set up for this syllabus, class notes, handouts, and homework. Remembered to read your notes every day.

Unless otherwise stated, All Homework is due at the beginning of the scheduled class period.

Stop Before you Drop
For students who enrolled in college level courses for the first time in the fall of 2007, Texas Education Code 51.907 limits the number of courses a student may drop.

You may drop no more than six courses during your entire undergraduate career unless the drop qualifies as an exception. Your campus counseling/advising center will give you more information on the allowable exceptions.

Remember that once you have accumulated six non-exempt drops, you cannot drop any other courses with a “W”. Therefore, please exercise caution when dropping courses in any Texas public institution of higher learning, including all seven of the Dallas County Community Colleges. For more information, you may access:
http://www.dcccd.edu/Why/Reg/Registration/Pages/default.aspx

Withdrawal Policy
(See E-Connect for DATE.)
If you are unable to complete this course, it is your responsibility to withdraw formally. The withdrawal request must be received in the Registrar’s Office by 12/2/2014 (You can always see Last Drop Date on E-Connect). Failure to do so will result in your receiving a performance grade, usually an “F.” If you drop a class or withdraw from the college before the official drop/withdrawal deadline, you will receive a “W” (Withdraw) in each class dropped. See institutional policies for additional information on
withdrawals.

Students who are receiving any form of financial aid should check with the Financial Aid Office prior to withdrawing from classes. Withdrawals may affect your eligibility to receive further aid and could cause you to be in a position of repayment for the current semester. Students who fail to attend or participate after the drop date are also subject to this policy.

Please consult with the instructor if you are considering dropping the course.

Attendance Policy

Students are expected to attend all class and lab sessions unless specifically excused in advance. Any optional dates will be listed in advance via E-Campus. **STUDENTS WHO MISS OR ARE LATE TO MULTIPLE CLASSES WILL LIKELY HAVE AT LEAST A LETTER GRADE DEDUCTION DUE TO CLASS ASSIGNMENTS MISSED AND LECTURES MISSED.** It is the students’ responsibility to check for missed assignments and notes.

Emergency Closings

Class will adhere to all Campus Closings for weather or other emergencies. Consult the College Website for Emergency Closings when in doubt. A subscription notification service is also available (see below).

Classroom Policies

No audio or video recording is allowed without instructor permission. Cell Phones should be placed on vibrate and students are expected to step out of room to take calls. Students are expected to behave and communicate with each other and the instructor in professional and respectful ways. No loud eating (smacking, crunching, slurping), and no tobacco spitting is allowed in class.

Participation

Students should expect a quiz, assignment, and/or lab to be given during each class session based on reading, lectures, or previous class topics. For maximum success in this course you should spend a **minimum** of 9 hours per week working/studying in addition to class time.
QUALITY ENHANCEMENT PLAN
Cedar Valley College's Quality Enhancement Plan is designed to improve student learning in mathematics. Read more about our QEP at:
http://www.cedarvalleycollege.edu/QEP/default.aspx

INSTITUTIONAL POLICIES

Academic Advising
Academic Advising is a collaborative educational process whereby students and their advisors are partners in meeting the students' academic, personal, and career goals. This partnership is a process that is built over the student’s entire educational career at Cedar Valley College.

Educational planning is available to all students. First time in college students must meet with academic advisors prior to enrolling in classes; however, continuing students may choose to see faculty advisors, faculty counselors, and/or program coordinators after classes begin. All parties have clear responsibilities for ensuring a successful partnership. For more information, you may access:
https://www.cedarvalleycollege.edu/FutureStudents/StudentServices/AcademicAdvising/Pictures/AdvisingSyllabus.pdf

Academic Honesty
Academic honesty is expected, and integrity is valued in the Dallas County Community Colleges. Scholastic dishonesty is a violation of the Code of Student Conduct. Scholastic dishonesty includes, but is not limited to, cheating on a test, plagiarism, and collusion.

ADA Statement
If you are a student with a disability and/or special needs who requires accommodations, please contact the college Disability Services Office at 972-860-8119.

Emergency Alert
Sign up for DCCCD Emergency Alerts to receive a text-message, e-mail and/or phone call when there is an unscheduled evacuation or closure of a DCCCD campus or office because of weather closures, utility outages, police or other emergencies. Subscribing
Financial Aid

Students who are receiving any form of financial aid should check with the Financial Aid Office prior to withdrawing from classes. Withdrawals may affect your eligibility to receive further aid and could cause you to be in a position of repayment for the current semester. Students who fail to attend or participate after the drop date are also subject to this policy.

Health Center Services

Basic first aid for minor cuts, scrapes, insect stings, and heat, etc.

- Over-the-counter medications for headaches, fever, seasonal allergies, and colds
- Over-the-counter medications for mild allergic reactions
- Emergency sanitary pads
- Blood Pressure check
- Coordination with outside health agencies such as Carter Blood Care; Dallas County Health Dept. (HIV/STD testing--free, twice a semester); UT Southwestern mobile mammography; Immunizations once a month for children <19 y.o. from the DCDHHS; Agape Massage; and Employee Wellness Screening
- Rest area for stress relief, migraine headaches, post seizure activity
- AED (Automatic External Defibrillator) for CPR
- Confidential "talks"
- Assists with health related club activities when asked and time permits

Honors Credit Availability

You may be able to earn Honors Credit in this course that will show the completion of an Honors Course on your transcript. Honors credit is important in transfer evaluation for graduation with both Associates and Bachelor degrees with honors. To gain Honors credit for this course you will need to:

1. Demonstrate advanced writing skills through synthesis and original thought in expanded writing projects, research papers, and critical essays. This will entail a minimum of ten pages of writing. You will be asked to read primary sources readings besides the textbook

is free, but standard text message charges from your cell phone provider will apply. Please refer to: http://www.dccc.edu/SS/OnlineSvs/EmergAlerts/Pages/default.aspx
2. Participate in an outside class activity by attending a lecture, exhibit or program outside of the class activities
3. You will practice your oral presentation skills with a 10-minute presentation to the class about a topic that you have researched

To qualify for Honors credit, you must sign an Honors Contract at the beginning of the semester (NOTIFY INSTRUCTOR ON FIRST DAY OF CLASS). It is the student’s responsibility to Meet with me to design your program and complete the contract form. Finally, you must earn an A or B in the course in order to receive Honors Credit.

Religious Holidays
Absences for observance of a religious holy day are excused. A student whose absence is excused to observe a religious holy day is allowed to take a make-up examination or complete an assignment within a reasonable time after the absence.

Repeating this Course
Effective for Fall Semester 2005, the Dallas County Community Colleges will charge additional tuition to students registering the third or subsequent time for a course. This class may not be repeated for the third or subsequent time without paying the additional tuition. Third attempts include courses taken at any of the Dallas County Community Colleges since the fall 2002 semester. More information is available at: http://www.dcccd.edu/PC/Cost/3rdCrseAttmpt/Pages/default.aspx

Student Code of Conduct
As a college student, you are considered a responsible adult. Your enrollment indicates acceptance of the DCCCD Code of Student Conduct published in the DCCCD Catalog. More information is available at: https://www1.dcccd.edu/catalog/ss/code.cfm?loc=CVC

Tutoring Services
It is strongly recommended that students take advantage of Friday morning and/or Saturday morning tutoring and bonus time. The Lab and Classroom will be open both days from 8:00 AM to 12:00 Noon and staff assistance is available.