<table>
<thead>
<tr>
<th>Course Information</th>
<th>Instructor Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>HART-2449-31211</td>
<td>Heat Pumps</td>
</tr>
<tr>
<td>Term</td>
<td>Fall 2015</td>
</tr>
<tr>
<td>Division</td>
<td>Business / Technology</td>
</tr>
<tr>
<td>Office Location</td>
<td>Bldg. H Room 113F</td>
</tr>
<tr>
<td>Class will meet</td>
<td>11/10/2015 to 12/16/2015</td>
</tr>
<tr>
<td>Class Start Time</td>
<td>8:00 AM to 12:15 PM MTWR</td>
</tr>
<tr>
<td>Email Address</td>
<td><a href="mailto:jtovar@dccc.edu">jtovar@dccc.edu</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>972-860-5203</td>
</tr>
<tr>
<td>Office Hours</td>
<td>7:15 AM to 8:00 AM and After 4:15 PM (up on Appointment)</td>
</tr>
<tr>
<td>Required Materials Including Textbooks</td>
<td>Note: A minimum of 9 hours per week should be devoted to course material outside of class time</td>
</tr>
<tr>
<td>C. Scientific Calculator</td>
<td></td>
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<tr>
<td>D. USB Flash Drive</td>
<td></td>
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<tr>
<td>E. Red Ball Point pen</td>
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<tr>
<td>F. Color Pencils</td>
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<tr>
<td>Course Prerequisites</td>
<td>Hart 1407 and Hart 1403</td>
</tr>
</tbody>
</table>

**Course Description:**
This course covers a study of Heat Pumps, Control Circuits, Defrost Controls, Auxiliary Heat, Airflow, and other topics related to heat pump systems.

**Discretionary:**
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 OUTCOMES

The student will explain a reverse cycle system; list the mechanical and electrical components for the heat pump operation; and explain the operation of heat pump modes including cooling, heating, defrost, emergency heat, and auxiliary/supplemental heat mode. The student will identify and explain different methods of accomplishing defrost; charge a system correctly in the heating and cooling mode; troubleshoot electrical and mechanical components; perform tests for adequate air flow; and determine balance point and C.O.P. (coefficient of performance).

Note:
Books used in this course may at times disagree with one another. The lectures given by the instructor are the primary source of information in this course and the books are supplemental. If you miss a class, reading the assignments for the day’s lecture will be helpful but incomplete. It is advisable that you obtain a copy of that day’s notes from another student.

CVC LEARNING SIGNATURE

CVC’s Learning Signature is One College Transforming Lives. Cedar Valley College establishes clear expectations for students through engagement and empowerment leading to excellence.

CVC Faculty and Staff expect students to:
• take responsibility for their own learning
• commit to achieving high academic performance
• be meaningfully engaged in the campus community

CVC Faculty and Staff expect to:
• provide students a clear pathway of instruction
• establish clear learning outcomes
• serve as role models and mentors for students

COURSE OUTLINE

For maximum success in this course you should spend a minimum of 9 hours per week working on course material.

EVALUATION PROCEDURES

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

Grading Scale
A  895-1000 points
B  795-894 points
C  695-794 points
D  595-694 points
F  Below 595 points
EXAMS AND ASSIGNMENTS

The final grade for the course reflects evaluation of the student’s work on the following assignments that are calculated as follows:

1. Pop Tests 100 points
2. Homework 100 points
3. Lab Exercises/Class Work 200 points
4. Lab Exam 200 points
5. Mid-Term Exam 200 points
6. Final Exam 200 points

TOTAL 1000 points

1. Pop Test
Several pop tests will be given during the semester. The final pop test grade will be the average of all pop tests. Pop tests will be given at the beginning of class. Students that are late to class 3 times, no more than 15 minutes will still be allowed to take the Test, after the third time they will get a copy of the test but will receive no credit for it. All pop tests will be taken up at the same time. Pop tests cannot be “made up”.

2. Homework
Several homework assignments will be given during the semester. The final homework grade will be the average of all homework assignments. Homework will mainly be graded by completion, any incomplete homework will not be graded. It is the student’s responsibility to complete and turn in assignments on time. All homework is due by 8:15 am of the next scheduled class. Late homework will not be accepted.

3. Lab practices
Lab Practices are to be completed during assigned class time. Each student is expected to complete and turn in lab exercises by the end of class period in which it was assigned. Students may discuss, consult, and observe others in the lab however, students must complete their own lab exercise. Students that miss class on a lab day will receive a grade of zero for that lab. Students are allowed to make up a maximum of 3 labs during tutoring hours.

Note:
50% of the lab grade will be deducted from students borrowing tools from the tool room or any other student. Students are responsible for having their own tools.
4. Lab Exam
In the structure of this course 400 points will be earned in the lab, 200 of these points are earned by lab exams. This is where you "show your stuff," after students have had the instruction and necessary practice in the lab, they will be evaluated on the performance of skills. In order for students to take the lab exam they must:

a. Be present in the lab at the time of the lab exam.
b. Have demonstrated safe work habits and proper electrical safety.
c. Have the tools required for the course.
d. Have tools marked with student identification.
e. Have completed assigned lab practices.

Note:
50% of the lab exam grade will be deducted from students borrowing tools from the tool room or any other student. Students are responsible for having their own tools.

5. Mid-Term and Final Exam
Major exams will be given over the material covered in class to include all lectures, pop tests, homework, demonstrations, and assigned class work. Each test will be comprehensive, to include material covered in the previous exam or semester.

Note:
Exams cannot be "Made Up" unless you have made specific arrangements with the instructor BEFORE the scheduled exam. In order for you to take the exam, you must be present at the time the exam is handed out. If you are late, you will be allowed to take the exam but no additional time will be allowed.

Bonus Option
A maximum of 50 bonus points are given for additional time spent studying under the supervision of a tutor or instructor. Bonus option points may be earned for extra time you spend in the lab or studying with the tutor. Tutors may be available in the lab Friday and Saturday mornings from 8:00 am to 12:00 pm. Bonus option forms must be signed by the tutor or instructor on the day the time is acquired. For each hour you have in bonus option time you will earn 1.667 points. This is based on perfect attendance in class. All bonus option forms are due on the last day of class before the final exam.
UNIT 1 COURSE GOALS

1. Refrigeration cycle components
   a. Compressors
   b. Indoor coils
   c. Outdoor coils
   d. Metering Devices
   e. Check valves
   f. Accumulators
   g. Refrigerant Lines
   h. Filter dryers
   i. Reversing valves
   j. Mufflers
   k. Refrigerant Charge Compensators
   l. Refrigerants
   m. 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 COURSE GOALS:

1. Electrical Components
   a. Compressors
   b. Fan motors
   c. Reversing valves
   d. Thermostats
   e. Defrost controls
   f. Defrost relays
   g. Defrost termination thermostats
   h. Outdoor ambient thermostats
   i. Heating elements
   j. Sequencers
   k. 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

ASSIGNMENTS

Assignments will be given to students through e-campus, printed and distributed in the classroom, and some assignments will only be made orally in class. Students are not reminded of assignments it is their responsibility to take notes.

TUTORING SERVICES

Bldg. H Room 113 Friday and Saturday 8:00AM to 12:00 Noon
CLASSROOM POLICIES

Cell phones will be set to vibrate/silent mode and if an emergency require the call be answered student should exit classroom before answering call so that class is not disrupted. Due to the length of the Class session drinks and snacks are permitted however you are required to keep classroom neat and orderly.

ATTENDANCE POLICY

You are expected to attend class regularly and consult with the instructor whenever an absence is necessary. An exam will be given at the end of each of the two units in the syllabus. You cannot “make-up” exams unless you have made specific arrangements with the instructor before the scheduled exam.

FINANCIAL AID CERTIFICATION OF ATTENDANCE

You must attend and participate in your on-campus or online course(s) in order to receive federal financial aid. Your instructor is required by law to validate your attendance in your on-campus or online course in order for you to receive financial aid. You must participate in an academic related activity pertaining to the course such as but not limited to the following examples: initiating contact with your instructor to ask a question about the academic subject studied in the course; submitting an academic assignment; taking an exam; completing an interactive tutorial; participating in computer-assisted instruction; attending a study group that is assigned by the instructor; or participating in an online discussion about academic matters relating to the course. In an online class, simply logging in is not sufficient by itself to demonstrate academic attendance. You must demonstrate that you are participating in your online class and are engaged in an academically related activity such as in the examples described above.

STOP BEFORE YOU DROP

Under a Texas law (TEC Section 51.907), if you drop too many classes without having an acceptable reason, your GPA could be affected. Be sure you understand how this law may affect you before you drop a class.

The law applies to students who enroll in a Texas public institution of higher education (including the colleges of DCCCD) for the first time in fall 2007 or later. Under this law, you may not drop more than six classes without an acceptable reason during your entire undergraduate career without penalty. For more information, please see our catalog or read Facts About Dropping Classes.

If you drop or withdraw before the official drop/withdrawal deadline, you will receive a grade of W (Withdraw) in each class dropped until the seventh unacceptable drop. You will earn a grade of WF for the seventh unacceptable drop, and each unacceptable drop after that. A grade of
WF will be calculated in your GPA as an F. The deadline for receiving a W is indicated on the academic calendar and the current class schedule.

For more information, you may access: http://www.dcccd.edu/Why/Reg/Registration/Pages/DropWithdraw.aspx

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

WITHDRAWAL POLICY

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 (____/____/____). 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.

EMERGENCY CLOSINGS

When the campus closes due unforeseen circumstances course work and instructions will continue using e-campus and emails to communicate.

TOOLS AND LOCKER USE

Students are expected to have their own tools for use in completing the required Labs. A tool list is provided at the end of this syllabus. Students may use any available locker and must furnish their own lock. Tools must be removed by the last day of class. Tools left in lockers after the last class day will be considered abandoned and will be given to Campus Police.

HONORS CREDIT AVAILABILITY

You can 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
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. Meet with me to design your program and complete the contract form by **September 12** in order to meet the **September 15** deadline for submission of Honors Contracts for approval. Finally, you must earn an A or B in the course in order to receive Honors Credit.

**SERVICE LEARNING**

The College offers a Service Learning Program that allows students to earn recognition for hours worked in a volunteer program with a local organization. See the Cedar Valley College website for additional information.  
http://www.cedarvalleycollege.edu/CommunityMembers/Lists/WebPages/DispForm2.aspx?List=4910a51c%2D65b2%2D4293%2D9ecd%2D5f5a383b44d&ID=17

**QUALITY ENHANCEMENT PLAN**

Cedar Valley College's Quality Enhancement Plan is designed to improve student learning in mathematics. Read more about our QEP at: 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.

We encourage you to meet with an advisor early during registration so you will have plenty of time to plan a schedule that works for you. Academic Advisors are located in building “L”, and can be reached at (972) 860-0806.
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

CVC WELCOME CENTER
The Cedar Valley College Welcome Center staff are available Monday-Thursday, 8:30am-7pm, Friday 8:30am-5pm to answer any general questions you may have. The main CVC telephone line for general information is (972) 860-0816.

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. See Also Student Code of Conduct. https://www1.dcccd.edu/catalog/ss/code.cfm?loc=CVC

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 is free, but standard text message charges from your cell phone provider will apply. Please refer to: http://www.dcccd.edu/SS/OnlineSvs/EmergAlerts/Pages/default.aspx

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

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: https://www1.dcccd.edu/catalog/ss/oepthird_attempt.cfm

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/cat1011/cattoc.cfm

DISCLAIMER

The instructor reserves the right to add, omit, or modify the syllabus as needed to insure the best possible learning experiences for students given the time and resources available.