Course Information | Instructor Information
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Hart 1403 31711 A/C Controls Principles | ELBERT D. SMITH
Spring 2015 | edsmith@dccc.edu, e999ds@sbcglobal.net
Business and Technology | 972-860-8192
11/10/15 – 12/16/15 6:00pm to 10:15pm MTWR Rm H-112

Course Description
A basic study of HVAC and refrigeration controls; troubleshooting of controls; identifying components in the control circuit; using wiring diagrams to analyze high and low voltage in a circuit; a review of Ohms’s law as applied to A/C controls and circuits.

Required Materials Including Textbooks (include ISBN)
Note: A minimum of 9 hours per week should be devoted to course material outside of class time

Course Prerequisites
Hart 1401

Disclaimer –
The instructor reserves the right to amend this syllabus as necessary.

Recommended Materials:
- Electricity for Refrigeration, Heating, and Air Conditioning
- Refrigeration and Air Conditioning Technology
- Sporlan Student Package
- Tecumseh / Copeland Student Package
- Alco Refrigerant Flow Controls
- Emerson Student Pack
- Instructor will inform you whether or not to purchase these books at a later date

The following list of course goals will be addressed in the course.

General Education Competencies (DCCCD Intellectual Competencies)
This course reinforces some of the Core Curriculum Intellectual Competencies defined by the Texas Higher Education Coordinating Board.

Enter the appropriate IC’s for this course
1. **READING**: Reading at the college level means the ability to analyze and interpret a variety of printed materials—book, article and documents.
2. **WRITING:** Competency in writing is the ability to produce clear, correct and coherent prose adapted to purpose, occasion and audience.

3. **CRITICAL THINKING:** Critical thinking embraces methods of applying both qualitative and quantitative skills analytically and creatively to subject matter in order to evaluate arguments and to construct alternative strategies. Problem solving is one of the applications of critical thinking, used to address and identified task.

4. **COMMUNICATION:** To develop skills in oral, visual, and written communication.

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**UNIT 1**

**COURSE GOALS**

1. Apply motor theory principles to wiring diagrams
2. Determine proper voltage readings on wiring diagrams
3. Determine replacement parts for compressors
4. Trace circuits on diagrams of central air conditioners that include:
   a. PSC motors
   b. CSCR motors
   c. Shaded pole motors
   d. CS motors
   e. Three phase motors
   f. Multi-speed motors
   g. Crankcase heaters
   h. Time delays
   i. Low pressure switches
   j. High pressure switches
   k. Contactors
   l. Starters
   m. Control relays
   n. Thermostats
   o. Fan Relays
   p. Overloads
   q. Positive temperature coefficient devices (PTC)
   r. Gas valves
   s. Resistive heaters
   t. Limit switches
   u. Sequencers
5. Use a voltmeter to determine the condition of components in a central air conditioner
6. Use an ohmmeter to determine the condition of components in a central air conditioner
7. Use an amp meter to determine the condition of components in a central air conditioner
UNIT 2

Course Goals

1. Troubleshoot diagrams of central air conditioners that include:
   a. PSC motors
   b. CSCR motors
   c. Shaded pole motors
   d. CS motors
   e. Three phase motors
   f. Multi-speed motors
   g. Crankcase heaters
   h. Start winding used as a crankcase heater
   i. Time delays
   j. Low pressure switches
   k. High pressure switches
   l. Contactors
   m. Starters
   n. Control relays
   o. Thermostats
   p. Single transformer circuits
   q. Dual transformer circuits
   r. Lock-out relays
   s. Fan relays
   t. Overloads
   u. Positive temperature coefficient devices (PTC)
   v. Gas valves
   w. Resistive heaters
   x. Limit switches
   y. Sequencers
   z.

2. Identify parts and locate pertinent information on central air conditioners, gas furnaces, and electric furnaces

3. Remove and replace fan motors

4. Remove, check, and install electrical components

5. Wire condensing units

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.

COURSE EVALUATION

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:

A = 1000 to 895,
B = 894 to 795,
C = 794 to 695,
D = 694 to 595,
F = below 595 points.
Grade point Breakdown

1. Pop Tests/Homework  150 pt's
2. Tool Test  50 pt's
3. Lab Exercises  300 pt's
4. Lab Exam  100 pt's
5. Major Exam  200 pt's
6. Final Exam  200 pt's

TOTAL  1000 pt's

ASSIGNMENTS:

Assignments are made in class. Some assignments will be printed and distributed in class. Some assignments will only be made orally in class. Students are not reminded of assignments.

1. POP TESTS

You will have several pop tests during the semester. The final pop test grade will be the average of all pop tests. Pop tests may be given anytime during class. All pop tests will be taken up at the same time. If you are late, I will allow you to take the pop test, I will not allow you any more time. Pop tests cannot be "made up." If you miss a pop test see the instructor for your copy of the pop test. One pop test will be dropped.

2. HOME WORK

You may or may not have home work assignments, the final home work grade will be the average of all home work assigned. All homework is due at the beginning of class, it is your responsibility to turn in the assignments. If you miss turning in your homework at the time it is due you will receive a zero "0" for that homework. I will not accept late homework.

3. LAB EXERCISES

Lab exercises are to be completed during assigned class time. Each student is expected to perform all lab exercises. You may discuss, consult, and observe others in the lab however, you must complete your lab exercise. If you miss turning in your lab exercise at the time it is due you will receive a zero "0" for that lab exercise. I will not accept late lab exercises. If you miss class on the day of the lab, you will receive a zero for that lab. One lab grade will be dropped.

4. LAB EXAM

In the structure of this course you will notice that 400 points will be earned in the lab, 100 of these points are earned by lab exams. This is where you "show your stuff,"
after you have had the instruction and practice necessary you will be evaluated on the performance of skills. In order for the student to take the lab exams the student must:

1. **Be present in the lab at the time of the lab exam.**
2. Have demonstrated safe work habits and proper electrical safety.
3. Have the tools required for the course.
4. Have tools marked with student identification.
5. Have completed assigned lab exercises.

### 5. MAJOR 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.

### NOTICE:

You cannot "Make Up" exams 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 not be allowed to take the exam.

### 6. FINAL EXAM

In order for you to have the opportunity to learn from the final exam, it will be given on the last class day and discussed on the day the final exam is scheduled. If you miss this scheduled discussion (final exam) you will be given a "0" on the final. All bonus option forms are due the day you take the final exam.

### NOTICE:

You cannot "Make Up" exams 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 not be allowed to take the exam.

### BONUS OPTION

Bonus option points are given for additional time spent studying under the supervision of a tutor or instructor. Bonus option points are 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. **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. These points are added to the total of all points earned.
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](http://www.cedarvalleycollege.edu/QEP)

Withdrawal Policy (with drop 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 ____________________. 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.

INSTITUTIONAL POLICIES

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, email 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:
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 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.

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

Tutoring Services
Location and Hours

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:  https://www1.dcccd.edu/coursedops

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