Hart 2445 31211 & 31711
RESIDENTIAL AIR CONDITIONING SYSTEMS DESIGN
Cedar Valley College
3030 No. Dallas Ave.  Lancaster, Texas 75134

<table>
<thead>
<tr>
<th>Course Information</th>
<th>Instructor Information</th>
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<tbody>
<tr>
<td>Hart</td>
<td>Ivory Armstead</td>
</tr>
<tr>
<td>2445-31211/31711</td>
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<tr>
<td>Residential Air Conditioning System Design</td>
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<table>
<thead>
<tr>
<th>Term</th>
<th>Fall 2015</th>
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<tbody>
<tr>
<td>Division</td>
<td>Business / Technology</td>
</tr>
<tr>
<td>Email Address</td>
<td><a href="mailto:iarmstead@dccc.edu">iarmstead@dccc.edu</a></td>
</tr>
<tr>
<td>Telephone</td>
<td>972-860-8170</td>
</tr>
</tbody>
</table>

| Classes will meet  | 11/10/15 Thru 12/16/15 |
| Class Start time   | Rm H-115                |
|                    | 8:00AM to 12:15PM MTWR  |
|                    | 6:00PM to 10:15PM MTWR  |
| Office Hours       |                         |
| Office Location    |                         |
|                    | Bldg. H Rm. 113E        |

<table>
<thead>
<tr>
<th>Required Materials Including Textbooks (include ISBN)</th>
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<tbody>
<tr>
<td>A. Manual J</td>
</tr>
<tr>
<td>B. Manual D</td>
</tr>
<tr>
<td>C. Scientific Calculator</td>
</tr>
<tr>
<td>D. Architect’s Ruler</td>
</tr>
<tr>
<td>E. Highlighter Pen</td>
</tr>
<tr>
<td>F. Pencils with Erasers</td>
</tr>
<tr>
<td>G. Flash Drive</td>
</tr>
<tr>
<td>H. Residential Blueprint (1,800 square feet living area or larger)</td>
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<table>
<thead>
<tr>
<th>Course Prerequisites:</th>
<th>Disclaimer –</th>
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<tbody>
<tr>
<td>None</td>
<td>The instructor reserves the right to amend this syllabus as necessary.</td>
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</table>

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

Student Learning Outcomes

Calculate heat loss and heat gain; design a complete duct system; size heating and cooling equipment to the structure; perform a load calculation using Manual J or other load calculation forms; and balance air flow on a duct system.

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.

Evaluation Procedures

<table>
<thead>
<tr>
<th>Projects</th>
<th>1000 points</th>
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Grading Scale

- **A** 895-1000 points
- **B** 795-894 points
- **C** 695-794 points
- **D** 595-694 points
- **F** Below 595 points

Projects will be given dates of completion and are due at the beginning of class on those dates. A grade will be given to each project based on **accuracy, appearance, and timeliness**.

Twenty-five (25) points out of 100 will be subtracted from the score for each class day the project is late.

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 **(12/8/15)**. 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.

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.

Emergency Closings

When the campus closes due unforeseen circumstances course work and instructions will continue using e-campus and emails to communicate.
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 do not have a maid and you are required to keep classroom neat and orderly.

Course Outline

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

Heat Load Calculations

Define the terms:
1. Degree Day
2. Outside Design Conditions
3. Inside Design Conditions
4. Building losses
5. Building gains
6. R value
7. U factor
8. Design temperature difference
9. Heat transfer multiplier (HTM)
10. Insulation
11. Sensible heat gains
12. Sensible heat losses
13. Latent heat gains
14. Saturated
15. Partition
16. Infiltration
17. Gross Wall area
18. Net wall area
19. Running feet of exposed wall
20. Partition area
21. Floor area
22. Ceiling area
23. Window area
24. Door area
25. Wall construction type
26. Ceiling construction type
27. Floor construction type
28. Roof construction type
29. Window type and construction
30. Door type and construction
31. Calculate with the use of the computer and Excel J Software
32. Window and Door Losses
33. System Losses
34. Wall Losses
35. Partition Losses
36. Ceiling Losses
37. Floor Losses
38. Duct heat loss
39. Infiltration losses
39 Window and door gains  
40 Wall gains  
41 Partition gains  
42 Ceiling gains  
43 Floor gains  
44 Duct heat gain  
45 People gains  
46 Appliance gains  
47 Infiltration gains  
48 Select the correct size air conditioner  
49 Select the correct size heater  
50 Develop a parts list for installing an air conditioner and furnace  
51 Formulate a bid to install an air conditioner and furnace

**Duct Design**

52 Static pressure  
53 Static pressure drop  
54 Take-off  
55 Branch  
56 Plenum  
57 Branch velocity factor  
58 Radial duct System  
59 Extended plenum duct system  
60 Reducing Extended plenum duct system  
61 Total effective length  
62 Cooling air flow factor  
63 Heating air flow factor  
64 Perimeter diffusers and registers  
65 Low sidewall registers  
66 Horizontal discharge outlets  
67 High sidewall register  
68 Ceiling diffuser and register  
69 Return grille  
70 Filter grille  
71 Duct Layout

**Size with the use of the computer and Excel D**

72 Outlets  
73 Branches  
74 Plenums  
75 Supply air ducts  
76 Return air ducts  
77 Registers  
78 Filter grilles  
79 Duct fittings  
80 Select the proper blower  
81 Develop a duct parts list  
82 Formulate a bid to install an air conditioner and furnace with a duct system  
83 Compare the operational cost of units of different efficiencies
Hyperlink Resources for Heating, Air Conditioning, and Refrigeration Jobs Online
http://careerbuilder.dallasnews.com/ Enter the keywords “hvac” and refrigeration
http://careers.yahoo.com/ Enter the keywords “hvac” and “refrigeration”

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

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, 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/current%20students/student%20services/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

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.
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>Religious Holidays</td>
<td>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.</td>
</tr>
<tr>
<td>Repeating this Course</td>
<td>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 <em>may not</em> 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: <a href="https://www1.dcccd.edu/catalog/ss/oepthird_attempt.cfm">https://www1.dcccd.edu/catalog/ss/oepthird_attempt.cfm</a></td>
</tr>
<tr>
<td>Student Code of Conduct</td>
<td>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 <a href="https://www1.dcccd.edu/cat1011/cattoc.cfm">https://www1.dcccd.edu/cat1011/cattoc.cfm</a></td>
</tr>
<tr>
<td>Tutoring Services</td>
<td>Location and Hours</td>
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<tr>
<td>Stop Before you Drop</td>
<td>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 your 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: <a href="https://www1.dcccd.edu/coursedops">https://www1.dcccd.edu/coursedops</a></td>
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