Residential Air Conditioning Systems Design (HART 2445)

Credit: 4 semester credit hours (2 hours lecture, 6 hours lab)

Prerequisite/Co-requisite: HART 1441

Course Description
Study of the properties of air and results of cooling, heating, humidifying or dehumidifying; heat gain and heat loss calculations including equipment selection and balancing the air system.

Required Textbook and Materials
   a. ISBN number is 10: 1-285-17998-6
2. Modern Refrigeration and Air Conditioning by Althouse, Turnquist, and Bracciano, 19th Edition
   a. ISBN number is 978-1-61960-199-4

Course Objectives
Upon completion of this course, the student will be able to:
1. Calculate heat loss and heat gain.
2. Design a complete duct system.
3. Size heating and cooling equipment to the structure.
4. Perform a load calculation using Manual J or other load calculation forms.
5. Balance air flow on a duct system.

Course Outline
A. Introduction
   1. Introduction of faculty and students
   2. Review Syllabus
   3. Review Class Policies
   4. Review Lab Assignments
B. Review of Basic Heat Transfer
   1. Convection
   2. Conduction
   3. Radiation
C. Blue Print
   1. Symbols
   2. Measurements
   3. Plans
D. Basic Geometry

Approved 12/2013
1. Calculating Area of various shapes  
2. Calculating Volume of various shapes  

E. Heat Load Calculations  
1. Calculating R & U values of building materials  
2. Calculating with Manual J formulas & work sheet  
3. Calculating with various Heat Load Software Programs  

F. Duct Design & Fabrication  
1. Delivering CFM  
2. Managing FPM  
3. Managing Static Pressure  
4. Efficient Layout  
5. Building Duct Work  
6. Sealing Duct Work  
7. Installing Duct Work  
8. NAIMA Certification

Grade Scale  
A = 90 - 100  
B = 80 - 89  
C = 70 - 79  
D = 60 - 69  
F = 0 - 59

Course Evaluation  
1. 4 Objective Test 25%  
2. Lab Projects/test 25%  
3. Comprehensive Final 25%  
4. Homework 25%

Course Requirements  
1. Homework assignments  
2. Hands on lab activities  
3. Complete comprehensive final  
4. AAS students should take HVAC Excellence Test.

Course Policies  
1. There will be no horseplay tolerated.  
2. No open foot shoes, sandals, or flip-flops: closed foot shoes only.  
3. No smoking, eating, or sleeping will be tolerated during class.  
4. If an assignment is late, there will be 5 points deducted per day.
5. No hanging jewelry or rings in lab.

Disabilities Statement
The Americans with Disabilities Act of 1992 and Section 504 of the Rehabilitation Act of 1973 are federal anti-discrimination statutes that provide comprehensive civil rights for persons with disabilities. Among other things, these statutes require that all students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodations for their disabilities. If you believe you have a disability requiring an accommodation, please contact the Special Populations Coordinator at (409) 880-1737 or visit the office in Student Services, Cecil Beeson Building.

Student Code of Conduct Statement
It is the responsibility of all registered Lamar Institute of Technology students to access, read, understand and abide by all published policies, regulations, and procedures listed in the LIT Catalog and Student Handbook. The LIT Catalog and Student Handbook may be accessed at www.lit.edu or obtained in print upon request at the Student Services Office. Please note that the online version of the LIT Catalog and Student Handbook supersedes all other versions of the same document.

Course Schedule

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<th>Topic</th>
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<td>Introduction &amp; Safety Orientation</td>
<td>Lecturer Notes &amp; Hand-Outs</td>
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<td>2</td>
<td>Review of Basic Heat Transfer Theory</td>
<td>Chapter 1 &amp; Lecturer Notes</td>
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<td>3</td>
<td>Reading Basic Blue Print Layouts</td>
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<td>Review of Basic Geometry</td>
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<td>5</td>
<td>Identifying R-Values of Various Building Materials &amp; Insulations</td>
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<td>6</td>
<td>Converting R-Values into U-Values &amp; calculating BTU Heat Gain/Loss</td>
<td>Lecturer Notes &amp; Lab Procedure</td>
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<td>7</td>
<td>Calculating BTU Heat Gain/Loss</td>
<td>Lecturer Notes &amp; Lab Procedure</td>
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<td>8</td>
<td>Calculating Manual J Heat Gain/Loss by Hand</td>
<td>Lecturer Notes, Chapter 27 &amp; Lab Procedure</td>
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<td>Calculating Manual J Heat Gain/Loss by Load Calculation Software</td>
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<td>Identifying Air Qualities &amp; Characteristics &amp; Measuring FPM/CFM</td>
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<td>Sizing an Air Distribution System</td>
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<td>Fabricating an Air Distribution System</td>
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<td>Final Exam</td>
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Contact Information:
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