AC R030L: AIRSIDE SYSTEMS LAB

Originator
aainsworth

College
Oxnard College

Discipline (CB01A)
AC - AirConditioning&Refrigeration

Course Number (CB01B)
R030L

Course Title (CB02)
Airside Systems Lab

Banner/Short Title
Airside Systems Lab

Credit Type
Credit

Start Term
Fall 2021

Formerly
ENVT R030L

Catalog Course Description
This course develops competency in the hands-on troubleshooting of air side problems in air conditioning/heating systems through an understanding of the principles of air flow, the properties of air, theory of controls, reading of construction drawings, and calculation of building loads. It is recommended for persons who want to develop or improve job skills in the air side segment of the air conditioning, heating and refrigeration industry through practice with live equipment and tools. Together with the lecture course (AC R030), this course targets the service technician who wishes to develop skills in designing and troubleshooting building air conditioning systems and controls. It is also applicable for students wishing to enter the industry in the capacity of installer, sales representative, maintenance technician, or designer.

Taxonomy of Programs (TOP) Code (CB03)
0946.00 - *Environmental Control Technology (HVAC)

Course Credit Status (CB04)
D (Credit - Degree Applicable)

Course Transfer Status (CB05) (select one only)
C (Not transferable)

Course Basic Skills Status (CB08)
N - The Course is Not a Basic Skills Course

SAM Priority Code (CB09)
C - Clearly Occupational

Course Cooperative Work Experience Education Status (CB10)
N - Is Not Part of a Cooperative Work Experience Education Program

Course Classification Status (CB11)
Y - Credit Course

Educational Assistance Class Instruction (Approved Special Class) (CB13)
N - The Course is Not an Approved Special Class

Course Prior to Transfer Level (CB21)
Y - Not Applicable

Course Noncredit Category (CB22)
Y - Credit Course

Funding Agency Category (CB23)
Y - Not Applicable (Funding Not Used)

Course Program Status (CB24)
1 - Program Applicable

General Education Status (CB25)
Y - Not Applicable

Support Course Status (CB26)
N - Course is not a support course

Field trips
May be required

Grading method
Letter Graded

Alternate grading methods
Credit by exam, license, etc.

Does this course require an instructional materials fee?
No

Repeatable for Credit
No

Is this course part of a family?
No

Units and Hours

Carnegie Unit Override
No

In-Class

Lecture
Minimum Contact/In-Class Lecture Hours
17.5
Maximum Contact/In-Class Lecture Hours
17.5

Activity

Laboratory
Minimum Contact/In-Class Laboratory Hours
52.5
Maximum Contact/In-Class Laboratory Hours
52.5

Total in-Class

Total in-Class
Total Minimum Contact/In-Class Hours
70
Total Maximum Contact/In-Class Hours
70

Outside-of-Class

Internship/Cooperative Work Experience

Paid

Unpaid

Total Outside-of-Class

Total Outside-of-Class
Minimum Outside-of-Class Hours
35
Maximum Outside-of-Class Hours
35

Total Student Learning

Total Student Learning
Total Minimum Student Learning Hours
105
Total Maximum Student Learning Hours
105

Minimum Units (CB07)
2
Maximum Units (CB06)
2

Student Learning Outcomes (CSLOs)

	Upon satisfactory completion of the course, students will be able to:
1	Students will demonstrate techniques for correctly sizing, installing, and testing air distribution systems.
2	Students will demonstrate the ability to read construction drawings and correctly identify the various components and their related symbols, used in air distribution systems.

Course Objectives

	Upon satisfactory completion of the course, students will be able to:
1	Identify the types of building systems and equipment that are called for in building construction drawings and actual installations
2	Use a psychrometric chart to calculate heating and cooling loads, required supply air conditions and quantities.
3	Read pneumatic control diagrams and set and adjust operating pneumatic controls to match specified conditions.
4	Use pneumatic control diagrams to troubleshoot systems with operating problems.
5	Read fan curves to select a fan for specified operating conditions.
6	Read duct-sizing charts to size ducts for specified air flows.

Course Content

Lecture/Course Content

1. Air Conditions and Flow
   a. Measurement of dry bulb temperatures
   b. Measurement of wet bulb temperatures
   c. Determination of other air conditions using a psychrometric chart
   d. Measurement of air velocities
   e. Calculation of air volumes
   f. Adjusting air flows to balance a duct system.
2. Reading Construction Drawings
   a. Fans
   b. Create a fan curve
   c. Demonstrate the fan laws
3. Perform Load calculations
   a. Transmission
   b. Infiltration
   c. Internal loads
   d. Dehumidification
   e. Sensible and latent loads
4. Set and Adjust Pneumatic Controls
   a. Transmitters
   b. Thermostats
   c. Receiver controllers
   d. Controlled devices
   e. Sensitivity, proportional band

Laboratory or Activity Content

The 30L lab class affords students an opportunity to get "hands on" experience/ training in the following.

1. Air Conditions and Flow
   a. Measurement of dry bulb temperatures
   b. Measurement of wet bulb temperatures
   c. Determination of other air conditions using a psychrometric chart
   d. Measurement of air velocities
   e. Calculation of air volumes
   f. Adjusting air flows to balance a duct system.
2. Reading Construction Drawings
   a. Fans
   b. Create a fan curve
   c. Demonstrate the fan laws
3. Perform Load calculations
   a. Transmission
   b. Infiltration
   c. Internal loads
   d. Dehumidification
   e. Sensible and latent loads
4. Set and Adjust Pneumatic Controls
   a. Transmitters
   b. Thermostats
   c. Receiver controllers
   d. Controlled devices
   e. Sensitivity, proportional band

Methods of Evaluation

Which of these methods will students use to demonstrate proficiency in the subject matter of this course? (Check all that apply):

Problem solving exercises
Skills demonstrations

Methods of Evaluation may include, but are not limited to, the following typical classroom assessment techniques/required assignments (check as many as are deemed appropriate):

Objective exams
Other (specify)
Projects
Problem-Solving Assignments

Other

Textbook Assignments

Instructional Methodology

Specify the methods of instruction that may be employed in this course

Audio-visual presentations
Class discussions
Demonstrations
Laboratory activities
Lecture

Describe specific examples of the methods the instructor will use:

- Classroom lecture, including equipment demonstrations, followed by the student actually performing these procedures and air side measurements and adjustments in class.
- Frequent quizzes and practice problems are used to stimulate student discussion.
- Class discussion, including problems encountered by students presently working in the field, are encouraged.
- Lab exercises where, after an instructor demonstration, students get the opportunity to perform the task.

Representative Course Assignments

Writing Assignments

Students complete written homework that consists of end-of-chapter questions, and solving problems presented during the class

Critical Thinking Assignments

Students will be assigned problems describing specific system/ space conditions, for various types of room designs, with the expectation of using logic and reasoning to identify if a problem exists and if one exists, formulate a plan to correct the fault. This includes determining which tools/ instruments are needed to assess the space conditions.

Reading Assignments

Students are asked to read the chapter assigned in order to understand more thoroughly the concepts presented in the class.

Skills Demonstrations

Students will be expected, at a minimum, to demonstrate the ability to:

1. Apply techniques for correctly sizing, installing, and testing air distribution systems for various scenarios/ building designs provided by the instructor.
2. Read construction drawings and correctly identify the various components and their related symbols, used in air distribution

Outside Assignments

Representative Outside Assignments

Reading: Students are asked to read the chapter assigned in order to understand more thoroughly the concepts presented in the class.

Writing: Students complete written homework that consists of end-of-chapter questions, and solving problems presented during the class

District General Education

A. Natural Sciences

B. Social and Behavioral Sciences

C. Humanities

D. Language and Rationality

E. Health and Physical Education/Kinesiology

F. Ethnic Studies/Gender Studies

CSU GE-Breadth

Area A: English Language Communication and Critical Thinking

Area B: Scientific Inquiry and Quantitative Reasoning

Area C: Arts and Humanities

Area D: Social Sciences

Area E: Lifelong Learning and Self-Development

CSU Graduation Requirement in U.S. History, Constitution and American Ideals:

IGETC

Area 1: English Communication

Area 2A: Mathematical Concepts & Quantitative Reasoning

Area 3: Arts and Humanities

Area 4: Social and Behavioral Sciences

Area 5: Physical and Biological Sciences

Area 6: Languages Other than English (LOTE)

Textbooks and Lab Manuals

Resource Type
Textbook

Description
Carter Stanfield and David Skaves (2017). *AHRI Fundamentals of HVACR* (3rd). Saddle River Pearson. 9780134016

Primary Minimum Qualification
AIR COND/REFRIG/HEATING

Review and Approval Dates

Department Chair
09/04/2020

Dean
09/06/2020

Technical Review
10/14/2020

Curriculum Committee
10/14/2020

Curriculum Committee
12/09/2020

CCCCO
MM/DD/YYYY

Control Number
CCC000313541

DOE/accreditation approval date
MM/DD/YYYY