

JEFFERSON COLLEGE

COURSE SYLLABUS

HRA160

**SHEET METAL DESIGN, SIZING, AND INSTALLATION FOR
HEATING, REFRIGERATION, AND AIR CONDITIONING**

3 Credit Hours

Prepared by
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Revised by
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HRA160 Sheet Metal Design, Sizing, and Installation for Heating, Refrigeration and Air Conditioning

I. CATALOGUE DESCRIPTION

- A. Prerequisites: Reading Proficiency
- B. 3 Credit Hours
- C. Sheet Metal Design, Sizing, and Installation for Heating, Refrigeration, and Air Conditioning introduces students to different types of ductwork and their appropriate uses and installation methods (F,S)

II. EXPECTED LEARNING OUTCOMES/ ASSESSMENT MEASURE

Students will differentiate between various types of ductwork and their uses	Quizzes and Projects
Students will use tables and charts to properly size ductwork	Quizzes and Airflow Measurements of Projects
Students will design ductwork for various types of installations	Quizzes and Lab Projects
Students will assemble various types of duct in lab and on a jobsite	Lab Projects and Fieldwork

III. OUTLINE OF TOPICS

- A. Ductwork Materials
 - 1. Galvanized steel duct
 - 2. Fiberboard duct
 - 3. Spiral metal duct
 - 4. Insulated flex duct
- B. Ductwork Sizing
 - 1. Indoor air quality
 - a) Mold
 - b) Radon
 - c) Dust
 - 2. Natural draft systems
 - 3. Forced draft systems
 - 4. System pressures

5. Measuring instruments
6. Fan drives
7. C.F.M. requirements for supply duct
8. C.F.M. requirements for return duct
9. Make up air requirements
 - a) Commercial
 - b) Residential

C. Ductwork Design including all Types of Materials

1. Plenum systems
 - a) Radial duct
 - b) Reducing extended plenum
 - c) Extended plenum
 - d) Perimeter loop
2. Return air
 - a) Residential requirements
 - b) Commercial requirements
3. Insulation
 - a) Inside ductwork
 - b) Outside ductwork
 - c) Where insulation is required
 - d) Methods of installation

D. Ductwork Assembly in lab and in the field

1. Sheet metal duct
 - a) Fabrication b) Assembly
 - (1) Slips
 - (2) Drives
 - (3) Fittings
 - (4) Hanging methods
 - (5) Installation methods
2. Insulated Flex duct
 - a) Hanging methods
 - b) Connection methods
 - c) Used as vibration isolation d) Length Limitations
3. Fiberboard duct

- a) Methods of cutting
- b) Assembly
- c) Transition fittings
- 4. Spiral duct
 - a) Connections
 - b) Mounting requirements

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. Labs
- C. Videos
- D. Demonstrations

V. REQUIRED TEXTBOOK(S)

Whitman, William C. *Refrigeration & Air Conditioning Technology*. (Current Edition). Clifton Park, NY: Delmar Cengage Learning

VI. REQUIRED MATERIALS

- | | | |
|----|--|------|
| A. | Set of Tin Snips (Left, Right, Straight) | \$75 |
| B. | Bar Folder | \$20 |
| C. | Crimpers | \$25 |
| D. | Hand Seamer | \$50 |
| E. | Duct Stretcher | \$25 |
| F. | Scratch Awl | \$5 |

VII. SUPPLEMENTAL REFERENCES: None

VIII. METHOD OF EVALUATION

- | | | |
|----|---------|-----|
| A. | Exams | 50% |
| B. | Quizzes | 10% |
| C. | Labs | 40% |

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Technology Center 101; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.