

ATSM-1220: LAYOUT AND FABRICATION II

Cuyahoga Community College

Viewing: ATSM-1220 : Layout and Fabrication II

Board of Trustees:

March 2020

Academic Term:

Fall 2020

Subject Code

ATSM - Applied Ind Tech- Sheetmetal

Course Number:

1220

Title:

Layout and Fabrication II

Catalog Description:

Covers sheet metal layout and design applications in conjunction with parallel line and radial line development. Included are shop exercises involving applied math and geometric concepts that are required for calculating cut sizes for ductwork. Soldering techniques for assembling sheet metal patterns will also be covered.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: admission to Sheet Metal Worker's apprenticeship program.

Outcomes

Course Outcome(s):

Develop patterns using parallel line and triangulation methods to transform flat metal into geometric shapes used for transitions and offsets.

Objective(s):

1. Apply math concepts to estimate material requirements.
2. Calculate sizes and measurements of flat metal to provide a cut list for ductwork.
3. Employ layout and cutting procedures that are required for ductwork fabrication.
4. Use hand and power tools to fabricate air transfer components.

Course Outcome(s):

Demonstrate the ability to employ radial line procedures to create bevel sided ductwork.

Objective(s):

1. Locate apex points for the development of ducts having slanted sides.
2. Develop patterns for slanted sided using apex points.
3. Produce slanted sided patterns by removing excess material.
4. Create transitions for duct opening sizes that are required for proper air transfer.

Course Outcome(s):

Assemble ductwork components to conform to mechanical and shop drawings.

Objective(s):

1. Connect sheet metal components using locking and seaming techniques.
 2. Employ soldering techniques to connect various assemblies.
 3. Use hand and power tools, including machinery, to join transitions, connections and duct.
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Methods of Evaluation:

1. Tests
2. Quizzes
3. Class participation

Course Content Outline:

1. Parallel line patterns
 - a. Applied math concepts
 - i. Fractions
 - ii. Decimals
 - iii. Area and volume
 - iv. Angular measure
 - b. Calculations
 - i. Duct sizes
 - ii. Apex points
 - iii. Pattern measurements
 - iv. Component cut list
 - c. Layout and cutting
 - i. Parallel line techniques
 - ii. Radial line
 - iii. Basic duct measurements
 - d. Tool selection
 - i. Specialty layout tools
 - ii. Locking and cutting tools
 - iii. Seaming tools
 - iv. Power tools
 - v. Machinery
2. Radial line
 - a. Apex points
 - i. Determining angles
 - ii. Side lengths
 - iii. Slant angles and measurements
 - b. Patterns
 - i. Establishing circumferences
 - ii. Layout angles
 - iii. Calculating and laying out measurements
 - c. Slanted patterns
 - i. Layout procedures
 - ii. Cutting techniques
 - iii. Forming applications
 - d. Transitions
 - i. Air volume transfer
 - ii. Duct opening requirements
3. Assembly
 - a. Joining methods
 - i. Hand
 - ii. Power
 - iii. Machines
 - b. Connections
 - i. Crimping
 - ii. Locking
 - iii. Mechanical connections
 - c. Soldering

- i. Equipment
 - 1. Gas lines
 - 2. Flux
 - 3. Solder
- ii. Heat
- iii. Material types
- iv. Techniques
- 4. Shop exercises
 - a. Layout
 - b. Cutting
 - c. Fabrication
 - d. Assembly
 - e. Installation
- 5. Triangulation
 - a. Pythagorean theorem
 - b. 3-4-5 method
 - c. Mathematical concepts

Resources

International Training Institute. *Core Curriculum*. 3rd ed. International Training Institute Alexandria, Va., 2015.

International Training Institute. *Sheet Metal Math*. 2nd. International Training Institute Alexandria, Va., 2007.

International Training Institute. *Layout Curriculum*. 1st. International Training Institute Alexandria, Va., 2010.

Resources Other

www. (<http://www.sheetmetalguy.com/bend-allowance.htm>)**sheetmetalguy.com/bend-allowance.htm**

www.**sheetmetal**workbook.com/ -

www. (<http://www.sheetmetalguy.com/bend-allowance.htm>)**sheetmetalguy.com/bend-allowance.htm**

www.knucklebusterinc.com/.../simplified-**sheet-metal-layout**/ -

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