

# ATSM-2330: LAYOUT AND FABRICATION III

---

## Cuyahoga Community College

**Viewing: ATSM-2330 : Layout and Fabrication III**

**Board of Trustees:**

2012-05-24

**Academic Term:**

Fall 2018

**Subject Code**

ATSM - Applied Ind Tech- Sheetmetal

**Course Number:**

2330

**Title:**

Layout and Fabrication III

**Catalog Description:**

Covers sheet metal layout, fabrication, and design applications in conjunction with the triangulation method of development. Included are shop exercises involving applied math, trigonometry, 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):**

3

**Lecture Hour(s):**

3

## Requisites

**Prerequisite and Corequisite**

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

## Outcomes

**Course Outcome(s):**

Develop patterns using the triangulation method to transform flat metal into geometric shapes.

**Objective(s):**

Apply math concepts to estimate material requirements

Calculate sizes and measurements of flat metal to provide a cut list for the ductwork to be made.

Employ layout and cutting procedures that are required for ductwork fabrication.

Use hand and power tools to fabricate air transfer components.

---

**Course Outcome(s):**

Demonstrate the ability to employ the triangulation method of layout to create ductwork fittings that will be used in the heating and cooling industry.

**Objective(s):**

Develop patterns using triangles where two points are known.

Produce patterns by removing excess metal.

Create ductwork fittings that could have different size and shape openings.

---

**Course Outcome(s):**

Assemble ductwork components to adhere to mechanical and shop drawings.

**Objective(s):**

1. Use hand and power tools, including machinery, to construct ductwork and connections.
  2. Connect sheet metal components using locking and seaming methods.
  3. Employ soldering techniques to connect various assemblies.
- 

**Methods of Evaluation:**

1. Tests
2. Quizzes
3. Class participation

**Course Content Outline:**

1. Triangulation
  - a. Applied math concepts
    - i. Fractions
    - ii. Decimals
    - iii. Angular measure
    - iv. Trigonometry
  - b. Calculations
    - i. Duct size
    - ii. True length triangles
    - iii. Component cut list
  - c. Layout and cutting
    - i. Triangulation
    - ii. Pattern development
  - d. Tool selection
    - i. Specialty layout tools
    - ii. Locking and cutting tools
    - iii. Seaming tools
    - iv. Power tools
    - v. Machinery
2. Transitions
  - a. Calculate material needed
    - i. Measurements
    - ii. Pythagorean theorem
    - iii. Trigonometry
    - iv. Determine angles
  - b. Patterns
    - i. Layout using calculations
    - ii. Establish lengths of sides
    - iii. Reflect offset in pattern development
    - iv. Use intersection points for layout
  - c. Slanted patterns
    - i. Layout procedures
    - ii. Cutting techniques
    - iii. Forming applications
3. Assembly
  - a. Joining methods
    - i. Hand tools
    - ii. Power tools
    - iii. Machines
4. Connections
  - a. Crimping
  - b. Locking
  - c. Mechanical connections
  - d. Soldering

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

## Resources

International Training Institute. *Core Curriculum*. 2nd. International Training Institute Alexandria, Va., 2007.

---

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

---

Budzik, Richard. *Today's 40 Most Frequently Used Fittings*. 5th. Practical Publications; Chicago, Il., 2010.

---

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

---

## Resources Other

www. (<http://www.sheetmetalworld.com/sheet-metal...sheet-metal.../>)**sheetmetalworld.com/sheet-metal...sheet-metal.../**  
 ca.ocregister.com/.../**Sheet-Metal-Installation**-Custom-Fabrication-San-Clemente  
 www. (<http://www.metalcraft.biz/sheetMetalInstallation.html>)**metalcraft.biz/sheetMetalInstallation.html**

Top of page

Key: 704