

# Drawing Interpretation-Industrial Maintenance

## Course Outcome Summary

### Course Information

<b>Organization</b>	Madison Area Technical College
<b>Developers</b>	William R. Lorenz
<b>Development Date</b>	4/1/1993
<b>Revised Date</b>	11/18/2005
<b>Course Number</b>	32-421-392
<b>Instructional Level</b>	Two-Year Technical Diploma
<b>Potential Hours of Instruction</b>	54
<b>Total Credits</b>	2

### Description

Studies basic principles of interpreting engineering drawings and schematics. Through interpretation and sketching, students develop a visualization of the part, section or assembly. Uses drawings pertinent to the trade along with examples and discussions of manufacturing procedures.

### Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	36	2
On-Campus Lab	18	

### Textbooks

Edward A. Maruggi. *Current Practices for Interpreting Engineering Drawings*. West Publishing Company. 1995.

Lowell W. Foster. *Geo-metrics II*. Addison Wesley Publishing Company. 1987.

### Learner Supplies

6 inch scale. **Manufacturer:** ---.

mechanical pencil. **Manufacturer:** ---.

eraser. **Manufacturer:** ---.

data storage device. **Manufacturer:** ---.

graph paper. **Manufacturer:** ---.

### Exit Learning Outcomes

#### Core Abilities

- Communication
- Critical thinking
- Science and Technology

### Program Outcomes

- A. Assume responsibility for continuing education in order to maintain skills and enhance professional growth
- B. Assemble, install, troubleshoot, diagnose, and repair manufacturing equipment, HVAC/R, building structures, electrical equipment, electronics, computer controlled production machine sensors, hydraulics, pneumatics, and plumbing systems.
- C. Diagnose complex problems using interdisciplinary technical skills
- D. Demonstrate work ethics and reliable behavior including, but not limited to, assuming responsibility for decisions and actions, utilizing time and stress management skills, displaying initiative, creativity, and logical thinking
- E. Demonstrate competent application of safety and regulation code compliance
- F. Communicate clearly and professionally in both written and verbal communications to customers, coworkers, and supervisors, using positive interpersonal skills including, but not limited to, respect, integrity, and professionalism

## **General Education Outcomes**

- A.1. assignment includes the identification of alphabet of lines

## **Competencies**

### **A. Interpret blueprints and technical drawings**

#### **Competence will be demonstrated:**

- A.1. by submitting completed homework assignment
- A.2. on a written evaluation

#### **Criteria - Performance will be satisfactory when:**

- A.1. assignment includes the interpretation of the alphabet of lines
- A.2. assignment includes the interpretation of dimensioning
- A.3. assignment includes the identification of different views
- A.4. assignment includes an identification of different material types
- A.5. assignment includes differentiating types of finishes from technical drawings
- A.6. you identify lines for technical drawing perspectives and sketches
- A.7. you communicate the importance of technical drawings for the manufacturing industry
- A.8. you identify dimensioning scales for technical drawings
- A.9. you reference the types of materials to be used from technical drawings
- A.10. you translate legends and symbol data from technical drawings

### **B. Interpret SI Metric System of projection and dimensioning**

#### **Competence will be demonstrated:**

- B.1. by submitting completed homework assignment
- B.3. on a written evaluation

#### **Criteria - Performance will be satisfactory when:**

- B.1. assignment includes the interpretation of SI metric measurements
- B.2. assignment includes the conversion of SI metric measurements to SAE measurements
- B.3. you explain dimensioning principles and standards
- B.4. you interpret dimensioning
- B.5. you use the universal system of measurement
- B.6. you determine linear and angular measurement tolerances

- B.7. you determine unilateral and bilateral tolerances
- B.8. you determine geometric tolerancing: form, location and runout

**C. Explore machine elements and processes**

**Competence will be demonstrated:**

- C.1. by submitting completed homework assignment
- C.2. on a written evaluation

**Criteria - Performance will be satisfactory when:**

- C.1. assignment includes the identification of the types of machinery
- C.2. assignment includes the identification of the parts of the machinery
- C.3. assignment includes the identification of the processes of the machinery (facing, turning, threading, milling, electric discharge machine, surface grinding)
- C.4. you identify external screw threads and fasteners
- C.5. you identify dimensioning of machined surfaces
- C.6. you interpret tapers design features and processes
- C.7. you interpret knurls design features and processes
- C.8. you identify spur gearing (rack and pinion gears)
- C.9. you differentiate between helical, worm and bevel gearing
- C.10. you identify cam motions drives
- C.11. you identify bearing features
- C.12. you identify types of splines

**D. Interpret sectional views**

**Competence will be demonstrated:**

- D.1. by submitting completed homework assignment
- D.2. on a written evaluation

**Criteria - Performance will be satisfactory when:**

- D.1. assignment includes the interpretation of half sections
- D.2. assignment includes the interpretation of broken-out sections
- D.3. assignment includes the interpretation of revolved sections
- D.4. assignment includes the interpretation of removed sections
- D.5. assignment includes the interpretation of rotated sections
- D.6. you differentiate between half sections, broken-out sections and offset sections
- D.7. you differentiate between revolved, removed sections, and rotated features
- D.8. you identify full sections
- D.9. you label phantom, auxiliary and assembly drawings
- D.10. you differentiate between pictorial assembly, axonometric oblique and perspective drawings
- D.11. you summarize how to dimension pictorial drawings
- D.12. you differentiate between title blocks, specifications and change notes
- D.13. you interpret detailed drawings

**E. Draw a machining project**

**Competence will be demonstrated:**

- E.1. by submitting completed homework assignment
- E.2. drawing must be interpreted correctly by instructor

**Criteria - Performance will be satisfactory when:**

- E.1. assignment includes drawing meeting industry standards

- E.2. assignment includes precise dimensioning
- E.3. assignment includes alphabet of lines
- E.4. assignment includes orthographic view
- E.5. assignment includes isometric view
- E.6. assignment includes identification of the material to be used
- E.7. assignment includes identification of the finish to be used
- E.8. assignment includes a legend
- E.9. you develop this drawing yourself (must be your own work)
- E.10. you communicate the concept it was intended to show
- E.11. you communicate and make clear all details associated with your project
- E.12. you communicate with a drawing that is neat and attractive

**F. Manufacture a object using machining processes**

**Competence will be demonstrated:**

- F.1. by submitting a completed object assignment

**Criteria - Performance will be satisfactory when:**

- F.1. assignment includes the identification of machine processes necessary to complete object
- F.2. assignment includes the identification of material to be used
- F.3. object is representative of the machine drawing and with pre-set tolerances

**G. Interpret building blueprints**

**Competence will be demonstrated:**

- G.1. by submitting completed homework assignments
- G.2. on a written evaluation

**Criteria - Performance will be satisfactory when:**

- G.1. assignment includes the identification of welding symbols
- G.2. assignment includes an interpretation of the sheet preparation
- G.3. assignment includes the interpretation of electrical circuits, symbols and drawings
- G.4. assignment includes the interpretation of plumbing and pipe drawings
- G.5. assignment includes the interpretation of complex automatic building control drawings
- G.6. assignment includes the interpretation of hydraulic and pneumatic drawings
- G.7. you interpret architectural drawings/blueprints
- G.8. you explore blueprint types

**H. Explore sketching and drawing**

**Competence will be demonstrated:**

- H.1. by submitting completed homework assignments
- H.2. on a written evaluation

**Criteria - Performance will be satisfactory when:**

- H.1. assignment includes sketched straight and curved lines
- H.2. assignment includes freehand lettering; upper and lower case
- H.3. assignment includes orthographic sketches
- H.4. assignment includes oblique sketches
- H.5. assignment includes isometric sketches
- H.6. assignment includes perspective sketches

H.7. you illustrate comprehensive sketches