COURSE TITLE: Manufacturing Math II

COURSE NUMBER: MFG* E105

CREDITS: 3

DESCRIPTION: Second course in manufacturing mathematics. A further study of arithmetic and trigonometric operations applied to manufacturing circumstances. The following geometric entities are studied in detail: the circle, regular and irregular polygons, the right triangle and oblique triangles. The application of angular arithmetic including the study of: angle decimal conversion, the Pythagorean Theorem, Sin, Cos, and Tan functions, and the Law of Sines and Law of Cosines.

PREREQUISITES: Completion of Machine Technology Level I Certificate, satisfactory score on math placement exam, or permission of instructor.

General Education Goals:

The student who completes this course will be able to:

> 2.1 - State a problem clearly
> 2.2 - Observe data accurately
> 2.3 - Analyze and organize facts and ideas
> 2.4 - Draw reasonable inferences from facts and ideas
> 3.2 - Receive and comprehend written and oral information
> 6.2 - Interpret numerical information as presented in charts and graphs

OTHER: The student who completes this course will be able to:

- Identify and make use of various geometric entities, including the circle, regular and irregular polygons, the right triangle and oblique triangles
- Apply trigonometric functions to physical situations
- Solve triangles using the Law of Sines and Law of Cosines
- Perform conversions from degrees-seconds to radians and back

COURSE CONTENT:

1. Angles and Lines
   a. Define basic geometric terms such as point, line, plane and angle
   b. Identify perpendicular and parallel lines and planes
   c. Identify types and sizes of angles
   d. Add, subtract, multiply and divide angles
   e. Convert degrees to decimal degrees and conversely

2. Polygons
   a. Identify regular and irregular polygons
   b. Determine the interior and exterior angle of a regular polygon
   c. Identify types and properties of triangles
   d. Identify types and properties of quadrilaterals
   e. Identify similar triangles
   f. Explain geometric principles related to the application of polygons to metalworking tasks

3. Pythagorean Theorem
   a. Compute the length of any side of a right triangle using the Pythagorean Theorem

4. Circles
   a. Identify the basic parts of a circle
   b. Define basic terms used in circular measurement

5. Functions of Angles
   a. Name and label the basic parts of a right triangle
   b. State three trigonometric functions for any angle
   c. Write sine, cosine and tangent ratios for any angle

6. Right Triangle Solutions
   a. Solve a right triangle given one side and one acute angle
   b. Solve a right triangle given two sides

7. Law of Sines
   a. Solve for sides and angles of oblique triangles using the Law of Sines

8. Law of Cosines
   a. Solve for sides and angles of oblique triangles using the Law of Cosines

   a. Define basic geometric terms such as point, line, plane and angle
   b. Perpendicular and parallel lines and planes
   c. Types and sizes of angles