MAC 151 Machining Calculations

COURSE DESCRIPTION:

Prerequisites: DMA 010, 020, 030; DRE 096, or satisfactory score on placement test
Corequisites: None

This course introduces basic calculations as they relate to machining occupations. Emphasis is on basic calculations and their applications in the machine shop. Upon completion, students should be able to perform basic shop calculations.

Course Hours per Week: Class, 1. Lab, 2. Semester Hours Credit, 2.

LEARNING OUTCOMES:

Upon completion of this course, the student will be able to:

1. Make calculations of length, weight, and volume within the metric system (SI).
2. Convert units of length, weight, and volume from the metric system to the English system and vice versa.
3. Calculate gear and pulley ratios using ratio and proportion.
4. Calculate the number of turns required to achieve the desired number of machined surfaces using both direct and plain dividing heads.
5. Calculate the perimeters of circles, triangles, and polygons.
6. Calculate the area within circles, triangles, and polygons.
7. Calculate the volumes of cylinders and rectangular solids.
8. Find the unknown side or angle of a right triangle using trigonometric functions.
9. Use trigonometric functions to find the taper of workpieces.
10. Use trigonometric functions to find the depth of screw threads.
11. Use the sine bar to setup for angle cuts on workpieces.
12. Calculate various dimensions of gear teeth using developed formulas.
13. Calculate pitch of screw threads using developed formulas.
14. Calculate cutting speeds and feeds on machine tools using developed formulas.

OUTLINE OF INSTRUCTION:

I. Metric system
    A. Calculations within the metric system (SI)
    B. Conversion
        1. Metric to English
        2. English to Metric

II. Ratio and proportion
    B. Gear and pulley ratios
    C. Indexing
        1. Direct
        2. Plain

D. Geometry
    1. Plane geometry
        a. Perimeters of circles, triangles, and polygons
        b. Areas of circle, triangles, and polygons
    2. Solid geometry – volumes
E. Practical problems
    1. Gear computations
    2. Pitch and depth of screw threads
    3. Cutting speeds and feeds
F. Algebra and Trigonometry problems
    1. Calculation of Algebra formulas
    2. Calculation of Trigonometry problems using sine, cosine, tangent

REQUIRED TEXTBOOK AND MATERIAL:

Mathematics for Machine Technology, 7th edition, author Robert D. Smith

ISBN # 9781133281450