

**MAC 151**  
**MACHINING CALCULATIONS**

**COURSE DESCRIPTION:**

Prerequisites: MAT 101

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.

**COURSE OBJECTIVES:**

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

- a. Make calculations of length, weight, and volume within the metric system (SI).
- b. Convert units of length, weight, and volume from the metric system to the English system and vice versa.
- c. Calculate gear and pulley ratios using ratio and proportion.
- d. Calculate the number of turns required to achieve the desired number of machined surfaces using both direct and plain dividing heads.
- e. Calculate the perimeters of circles, triangles, and polygons.
- f. Calculate the area within circles, triangles, and polygons.
- g. Calculate the volumes of cylinders and rectangular solids.
- h. Find the unknown side or angle of a right triangle using trigonometric functions.
- i. Use trigonometric functions to find the taper of workpieces.
- j. Use trigonometric functions to find the depth of screw threads.
- k. Use the sine bar to setup for angle cuts on workpieces.
- l. Calculate various dimensions of gear teeth using developed formulas.
- m. Calculate pitch of screw threads using developed formulas.
- n. 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
  - A. Gear and pulley ratios
  - B. Indexing
    - 1) Direct
    - 2) Plain
  - C. Geometry
    - 1) Plane geometry
      - (a.) Perimeters of circles, triangles, and polygons
      - (b.) Areas of circle, triangles, and polygons
    - 2) Solid geometry - volumes
  - D. Practical problems
    - 1) Gear computations
    - 2) Pitch and depth of screw threads
    - 3) Cutting speeds and feeds
  - E. Algebra and Trigonometry problems
    - 1) Calculation of Algebra formulas
    - 2) Calculation of Trigonometry problems using sine, cosine, tangent

**REQUIRED TEXTBOOKS AND MATERIALS:**

Smith, Robert D. Mathematics for Machine Technology. 5<sup>th</sup> ed.

**STATEMENT FOR STUDENTS WITH DISABILITIES:**

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 686-3652 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1309.