

# MAC 141 MACHINING APPLICATIONS I

## COURSE DESCRIPTION:

Prerequisites: MAT 060 or DMA 010, 020, 030, and RED 070 or DRE 096, or satisfactory score on placement test

Corequisites: None

This course provides an introduction to a variety of manufacturing processes that are common to the machining industry. Topics include safety, process specific machining equipment, measurement devices, set up and layout instruments, and common shop practices. Upon completion, students should be able to safely demonstrate basic machining operations, occur to the measurement components, and effectively use layout instruments. Course Hours Per Week: 3 Credit

## LEARNING OUTCOMES:

Upon completion of this course the student is expected to

- a. Follow safety rules and regulations in the shop
- b. Select and use semi-precision tools
- c. Select and use precision tools
- d. Layout workpiece
- e. Measure features properly
- f. Measure horizontal and vertical angles
- g. Measure vertical and horizontal angles
- h. Identification of parts and operation of drilling machine
- i. Identification of parts and operation of engine lathe
- j. Identification of parts and operation of manual and automatic surface grinders
- k. Manufacture simple parts using drilling machine, engine lathe, and surface grinders

In addition to the above objectives and depending upon module assignments, the student is expected to perform one or more of the following:

## OUTLINE OF INSTRUCTION:

- I. Orientation and Safety
  - A. Safety rules and regulations
  - B. Safety glasses and goggles
  - C. Type
  - D. Cutting methods
  - E. Adjustments
  - F. Storage

C Fire extinguisher

- Location
- Uses

D Aids

- Route to aids
- Aids and signs

II Basic Hand Tools

A Types

B Use

C Safety practices

D Storage

III Measuring Tools

A Selecting precision measuring tools

- Types
- Care
- Use

Storage

B Precision measuring tools

- Types
- Care
- Use

Storage

I Layout Tools and Equipment

A Types

B Care

C Use

D Drawing interpretation Blueprint Reading

Hand Cutting Tools

A Files

- How to use
- Proper holding method
- Use of file card

I Measuring Methods

A Selecting precision measuring tools

- Measure with vernier scale to accuracy of 0.001 P
- Use dial indicators to transfer

5. Measure surface height gauge on surface plate to scribble and measure lines on vertical surface

## B Precision Measuring Tools

- Read micro meter to accuracy of 0.001 mm
- Measure inside and outside diameters using spring calipers and transfer these measurements using micro meters
- Measure inside diameter of hole using telescoping gauges and transfer these measurements using micro meters
- Measure the depths of holes, slots and grooves using depth micro meter
- 5. Measure surface plate and vertical height gauge to inspect for runout, flatness, squareness and dimension accuracy
  - Use dial indicator and precision gauges to inspect workpieces
  - Use vertical caliper and read dimensions to accuracy of 0.01 mm

## II Bench Work

A Layout lines for drilling, planing and turning

B Filing

• Remove burrs on parts using file or deburring tool

C Threading

- Thread holes using taps and tap wrench
- Thread round stock using dies and die stock

## III Power Operations

A Horizontal Mills

- Use horizontal mills to cut rough stock of various shapes to length using proper coolant
- Install depth with proper tension and set feed

B Vertical Mills

- Feed mills using end cutting tool and test by ending
- Cut layout contours, circles and straight lines on mills
  - Select proper depth and speed for tool to be used
  - Install depth on mills, adjusting guides and depth tension
- 5. Feed up depth for storage

## IX Drill Press Operations

A Drill Grinding

- Sharpen drills to correct angles and relief for various cuts using drill grinder
- Sharpen drills to correct angles and relief for various cuts by freehand method using pedestal grinder

B Sensitive Drill Press

- Make setups for drilling round stock, flat stock, sheet metal and irregular shapes
- Use proper work holding devices
- Drill holes in different types of metal

C Air or Press

Use or press for roughing and pressing parts on and off the press

X Engine L the

A Setup

- Check and mount chucks using wooden blocks or cradles to protect the ways
- Determine proper speeds and feeds for particular materials and the operations
- Grinding wheel turning and for grinding tools

## XII Surface Grinder – Automatic

### A Setup

- Dress grinding wheel using diamond tipped dresser
- Cut work piece using magnetic chuck and locating up or piece
- Select appropriate grinding wheel for grinding wheel for dressing grinding wheel cutting technology

### B Operations

- Operate machine controls
- Grind work piece to specific dimension

## REQUIRED TEXTBOOKS AND MATERIALS:

Miller, Peter. Machine Tool Practices, 4th ed. ISBN 0-07-000000-0

Suggested reference products and materials to be announced  
Students will need specific equipment

## STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from disability services course or 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 disability services course or within the first two weeks of class. Course instructors are contacted by calling Peter or by visiting the Student Development Office in the Phoenix Center for Student Services Center.