



MASTER COURSE OUTLINE

Prepared By: Bill Autry

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COURSE TITLE

Machining I

GENERAL COURSE INFORMATION

Dept.: IST

Course Num: 180

(Formerly:)

CIP Code: 47.0303

Intent Code: 21

Program Code: 768

Credits: 5

Total Contact Hrs Per Qtr.: 77

Lecture Hrs: 33

Lab Hrs: 44

Other Hrs:

Distribution Designation:

COURSE DESCRIPTION (as it will appear in the catalog)

Layout and fabrication techniques with the use of semi-precision and precision measurement tools. Introduction to Drill Press, Engine Lathe and Vertical Mill operations.

PREREQUISITES

IST 102 and MAP 103/117 or Instructor Permission

TEXTBOOK GUIDELINES

Appropriate textbook as determined by faculty (Example: *Machining Fundamentals*, by John R. Walker)

COURSE LEARNING OUTCOMES

Upon successful completion of the course, students should be able to demonstrate the following knowledge or skills.

- 1) Demonstrate the necessary skills to safely and accurately perform layout and fabrication functions
- 2) Measure parts with semi-precision measurement techniques
- 3) Perform machine shop bench work functions such as off-hand grinding, filing, tapping, and use of hand power tools safely.
- 4) Students will be able to demonstrate introductory machining functions with vertical mills and Lathes

INSTITUTIONAL OUTCOMES

COURSE CONTENT OUTLINE

- A. Bench Work Operations ~
 - a. Cut threads with taps and dies.
 - b. Remove threaded fastens and repair threads.
 - c. De-burr parts
 - d. Rough finish parts with hand filing
 - e. Rough grind parts with hand grinders
 - f. Work materials with hand tools
 - g. Work materials with portable power tools

- h. Measure parts with semi-precision measuring
- B. Performing Precision Measurement ~
 - a. Inspect parts with precision measuring tools
 - b. Inspect parts using go/no go gages
 - c. Measure parts using Vernier measuring tools, outside , inside, depth, and special micrometers
 - d. Measure parts using telescoping gages and small hole gages
 - e. Set up and inspection with the use of dial indicators
 - f. Measure threads
 - g. Verifying dimensions, alignments, and clearances
- C. Performing Layouts ~
 - a. Analyze specifications
 - b. Perform semi-precision layouts
 - c. Perform sheet metal layouts from blueprints
 - d. Perform layouts from templates
- D. Operating Saws ~
 - a. Remove and Replace saw blades
 - b. Set up and use horizontal band saw
 - c. Perform basic saw maintenance
- E. Operating Drilling Machines ~
 - a. Select drills using a drill chart
 - b. Use and maintain coolant system for drilling
 - c. Change drills and tool holders
 - d. Calculate and set drilling speeds, feeds, and depth of cut
 - e. Align work piece, jigs and fixtures with drill spindle
 - f. Center drill and drill holes to size
 - g. Countersink, counterbore, and spot face parts to specifications
 - h. Drill blind holes and deep holes to specifications
 - i. Thread parts using tapping attachment
 - j. Ream holes to size
 - k. Angle drill holes
 - l. Sharpen drill bits
- F. Operating Bench Grinders ~
 - a. Change and dress grinding wheels
 - b. Grind lathe turning, forming threading, and cut-off tools
 - c. Rough grind materials
 - d. Perform basic grinder maintenance
- G. Basic Lathe Operation ~
 - a. Use and maintain coolant system on the lathe
 - b. Calculate and set lathe speeds, feeds, and depth of cut
 - c. Face and turn parts in 3 jaw chuck
 - d. Machine parts between centers
 - e. Align lathe centers
 - f. Perform basic lathe maintenance
- H. Basic Vertical Mill Operation ~
 - a. Calculate and set speeds, feeds and depth of cut
 - b. Align the vertical mill head

- c. Align work piece, work holding devices, jigs and fixtures
- d. Use of the coolant system
- e. Changing of tool holders and cutters
- f. Machine parts using end milling cutters
- g. Machining parts square on the vert. mill
- h. Machining keyways
- i. Set up vertical milling machine for manual operation

DEPARTMENTAL GUIDELINES *(optional)*

DIVISION CHAIR APPROVAL

DATE