## MACH 51A Course Outline as of Fall 2004

# **CATALOG INFORMATION**

Dept and Nbr: MACH 51A Title: BEG MACHINE TOOL TECH Full Title: Beginning Machine Tool Technology Last Reviewed: 2/28/2022

Units		Course Hours per Week	]	Nbr of Weeks	<b>Course Hours Total</b>	
Maximum	2.00	Lecture Scheduled	1.00	17.5	Lecture Scheduled	17.50
Minimum	2.00	Lab Scheduled	3.00	8	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 35.00

Total Student Learning Hours: 105.00

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

### **Catalog Description:**

Introduction to theory and practices of machining processes. Includes use and care of the lathe, mill, drill press, and common hand tools, and the measurement and layout of metal for producing a machine part to print specifications. Also recommended for students in related vocational areas.

**Prerequisites/Corequisites:** 

**Recommended Preparation:** 

### **Limits on Enrollment:**

### **Schedule of Classes Information:**

Description: Introduction to theory and practices of machining processes. Use and care of the lathe, mill, drill press and common hand tools; measurement and layout of metal for producing machine parts to print specifications. (Grade Only) Prerequisites/Corequisites: Recommended:

# **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

AS Degree: CSU GE:	Area Transfer Area	l		Effective: Effective:	Inactive: Inactive:
<b>IGETC:</b>	Transfer Area			Effective:	Inactive:
CSU Transfer	:Transferable	Effective:	Fall 1981	Inactive:	
UC Transfer:		Effective:		Inactive:	

## CID:

**Certificate/Major Applicable:** 

Certificate Applicable Course

# **COURSE CONTENT**

## **Outcomes and Objectives:**

Upon successful completion of this course the student will be able to: 1. Trace the development of the history and methods of machine tool technology.

2. Identify and use common shop safety practices and equipment to prevent shop safety hazards.

3. Demonstrate knowledge of the theory of machining as applied to machine tool techniques.

4. Recognize and predict changes in the properties of metal when exposed to machine tool techniques.

5. Identify and describe applications of common mechanical hardware and hand tools found in the machine shop.

6. Read and interpret common detail drawings found in a machine shop.

7. Calculate and set appropriate angles for grinding a tool bit.

8. Describe set-up, operation, and safety procedures for the pedestal grinder.

9. Select the correct feeds and speeds for commonly used materials.

10. Describe the tools and methods of metrology/dimensional measurement.

11. Identify and describe the important components, controls, and functions of vertical and horizontal milling machines.

12. Compare and contrast three basic drill press types and explain their differences and primary uses.

13. Classify types of saws and describe their uses.

14. Calculate cutting speeds and feeds for a variety of machining processes.

15. Identify common methods of measurement conversions.

16. Identify the most important parts of the lathe, drill, and mill and describe the function of each relative to producing parts on manually operated machines.

17. Identify realistic career objectives in machine tool technology.

# **Topics and Scope:**

- I. History of Machine Tooling
- A. Development of technologies
- B. Development of power sources
- II. Machine Tool Theory
- A. Common manufacturing materials and processes
- B. Properties of metals
- III. Shop Safety
- A. Practices
- B. Equipment
- IV. Grinding
- A. Tool bit grinding procedures and clearances
- B. Calculating and setting angles
- C. Pedestal grinder
  - 1. care
  - 2. safety
  - 3. set-up
- 4. use
- V. Lathes/Turning Machines
- A. Use
- B. Safety
- C. Set-ups
- D. Parts and functions
- E. Types of machines
- VI. Blueprint reading and interpretation
- VII. Metrology/Dimensional Measurement
- A. Types of measuring instruments
- B. Scales and rules
- C. Micrometer
- D. Height gage and vernier-scale
- VIII. Milling Machines
- A. Vertical mills
- B. Horizontal mills
- C. Components, controls, and functions
- D. Care
- E. Safety
- F. Tooling operations
- G. Set-up
- H. Feeds
- I. Speeds
- J. RPM
- IX. Drill Presses
- A. Types
- B. Care
- C. Safety
- D. Uses
- E. Drill speeds
- F. Feeds
- G. RPM

- H. Drill bits
  - 1. sharpening
- 2. nomenclature
- X. Saws
- A. Types
- B Care
- C. Safety
- D. Set-up
- E. Uses
- XI. Hand Tools
- A. File types
- B. Hammers
- C. Hacksaws
- D. Safety
- E. Vises
- XII. Careers in Machine Tool Technology
- A. Career options
- B. Workplace ethics
- C. Professionalism

## Assignment:

Representative assignments.

- 1. Reading from assigned text, approximately 15 pages/week.
- 2. Weekly quizzes based on reading.
- 3. Lab projects related to creating hand and machine tool components.

Projects will be graded for skill demonstration and problem solving and may include:

- a) on a lathe, produce a hand tool by manufacturing parts & components;
- b) set up a mill and mill a metal plate from a blueprint;
- c) grind a tool bit, calculating and setting appropriate angles.
- 4. Compile a lab notebook of course notes and handouts.
- 5. Organize workspace and clean-up lab area.
- 6. Final objective and performance exams.

## Methods of Evaluation/Basis of Grade:

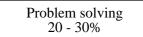
**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Compile a lab notebook.

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Lab projects.

Writing 10 - 20%



# **Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, Performance exams

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, True/false, Matching items

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance, organization, and clean-up.

## **Representative Textbooks and Materials:**

Machine Tool Practices, Kibbe, R., Neely, D., and White, W. 7th edition, 2003.

Instructor prepared materials.

Skill Demonstrations 20 - 30%
Exams 20 - 30%

Other Category 20 - 30%