

MACH 51B Course Outline as of Fall 2011**CATALOG INFORMATION**

Dept and Nbr: MACH 51B Title: ADV MACHINE TOOL TECH

Full Title: Advanced Machine Tool Technology

Last Reviewed: 2/28/2022

| Units | Course Hours per Week | | Nbr of Weeks | | Course Hours Total | |
|---------|-----------------------|-------------------|--------------|------|--------------------|-------|
| 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:

Advanced machining processes involving the use and care of lathe, mill, drill press, and common hand tools. Measurement, layout, and tolerance application processes relevant to industrial manufacturing.

Prerequisites/Corequisites:

Course Completion of MACH 51.1A (or MACH 51A)

Recommended Preparation:

Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:**Schedule of Classes Information:**

Description: Advanced machining processes involving the use and care of lathe, mill, drill press, and common hand tools. Measurement, layout, and tolerance application processes relevant to industrial manufacturing. (Grade Only)

Prerequisites/Corequisites: Course Completion of MACH 51.1A (or MACH 51A)

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

| | | | |
|-------------------|----------------------|------------|-----------|
| AS Degree: | Area | Effective: | Inactive: |
| CSU GE: | Transfer Area | Effective: | Inactive: |

| | | | |
|---------------|----------------------|------------|-----------|
| IGETC: | Transfer Area | Effective: | Inactive: |
|---------------|----------------------|------------|-----------|

| | | | | |
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| CSU Transfer: | Transferable | Effective: | Fall 1981 | Inactive: |
|----------------------|--------------|------------|-----------|-----------|

| | | | | |
|---------------------|--|------------|--|-----------|
| UC Transfer: | | Effective: | | Inactive: |
|---------------------|--|------------|--|-----------|

CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Outcomes and Objectives:

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

1. Safely operate a variety of machine tools without supervision.
2. Set up machines and produce machine parts independently.
3. Calculate speeds, feeds, and RPM (revolutions per minute) for machining various metals.
4. Perform precision layouts using metrology layout tools.
5. Calculate and cut tapers and angles.
6. Determine tolerances according to manufacturing standards.
7. Manufacture and "finish" a machined part according to blueprint specifications.
8. Identify and locate information in text manuals used in industry.
9. Demonstrate proper safety practices, procedures, and professionalism.

Topics and Scope:

- I. Orientation and Safety
- II. Materials and Processes
 - A. Ferrous metals
 - B. Non-ferrous metals
- III. Material Calculation Formulas
 - A. Feeds
 - B. Speeds
 - C. RPM. (revolutions per minute)
- IV. Metrology Layout Tools
 - A. Sine bar
 - B. Protractors
 - C. Gages
 - D. Optical alignment magnifier
- V. Drill Press Operations
 - A. Tools
 - B. Proper set-up procedures

VI. Advanced Lathe Operations

A. Cutting

1. Tapers
2. Angles

B. Boring

C. Work Holding Devices

VII. Tooling: Use, Care, and Identification

A. Types

B. Coolants

VIII. Cutting Tools

A. Types

B. Calculations

IX. Advance Mill Operations

A. Surface finish

B. Tolerances

C. Work Holding Devices

X. G.D.& T. (Geometric dimensioning and tolerances)

A. Tolerance applications

B. Allowances

C. Precise fitting

D. Manufacturing standards

XI. Industrial Text Manuals

A. "Machinery's Handbook" machinist reference handbook

B. Online research

XII. Metrics

A. Application

B. Use of conversion tables used in industry

XIII. Professionalism

A. Safety

B. Production quality

C. Proper work habits

Assignment:

1. Readings in assigned text, approximately 15 to 20 pages per week
2. Lab projects will be graded for skill demonstration and problem solving and may include:
 - a) Calculations of speeds and feeds
 - b) Cut taper, angles, and chamfers
 - c) Cut a Morris taper and verify angles with a sine bar and dial indicator
 - d) Cut internal threads on a lathe using a boring bar
 - e) Adherence to proper safety procedures
 - f) Written process procedures
3. Compile a notebook of lab notes and handouts
4. Organize workspace and clean up lab area
5. 3 to 5 quizzes, including safety, and final exam

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.

Project preparation, process procedures, labnotes

Writing
20 - 30%

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

Lab projects and lab notebook

Problem solving
10 - 30%

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

Lab projects, demonstration of proper safety procedures

Skill Demonstrations
20 - 35%

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

Quizzes, and final exam: true/false, multiple choice

Exams
20 - 30%

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

Participation, preparation, work habits

Other Category
10 - 20%

Representative Textbooks and Materials:

Machine Tool Practices, by Kibbe, Keely, Meyer, White; published by Prentice Hall, 9th Ed. 2010.

Instructor prepared materials