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:
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