

CATALOG INFORMATION

Dept and Nbr: MACH 53

Title: METROLOGY

Full Title: Metrology

Last Reviewed: 3/9/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	1.00		Contact DHR	17.50
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00

Total Student Learning Hours: 175.00

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 09 - 6 Units Within 4 Semesters

Also Listed As:

Formerly:

Catalog Description:
Metrology is the study of the science of precision measurement used in manufacturing, assembly, and inspection. Students will become familiar with all types of handheld measuring devices and electronic and optical measuring/inspection tools and systems currently in use. Visits to sites where Coordinate Measuring Machine applications are used are required.

Prerequisites/Corequisites:
Course Completion of MACH 162 (or MACH 52)

Recommended Preparation:

Limits on Enrollment:

Schedule of Classes Information:
Description: Metrology is the study of the science of precision measurement used in manufacturing, assembly, and inspection. Students will become familiar with all types of handheld measuring devices and electronic and optical measuring/inspection tools and systems currently in use. Visits to sites where Coordinate Measuring Machine applications are used are required. (Grade Only)

Prerequisites/Corequisites: Course Completion of MACH 162 (or MACH 52)

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: 6 Units Within 4 Semesters

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 2000	Inactive:	Summer 2012
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:

Certificate Applicable Course

COURSE CONTENT

Outcomes and Objectives:

Students will be able to check dimensions using:

1. Rulers and Scales in both inch and metric standard.
2. Standard, Digital, and Electronic Laser Micrometers in both inch and Metric standard.
3. Vernieres in both inch and metric standard.
4. Height Gauges: Standard, Dial, Digital, and Electronic.
5. Optical Comparator.

Students will be able to describe the application and operation of Coordinate Measuring Machines (CMM) and Non-Contact measuring tools

Topics and Scope:

1. Dimensioning and Tolerancing notes gauging with measurement tools ö calipers and micrometers.
2. Units of measurements system international (S.I. Metric) and U.S. customary linear units using the vernier scale principles.
3. Dimensions representations on drawings, calculations to describe degrees (angular units) utilizing sine bars and optical comparators.
4. Cartesian principles ö coordinate dimensions incremental and absolute
5. Coordinate measuring machines (C.M.M.) types and sizes. Relationships to vernier principles, micrometers, and height gages.

Assignment:

Students will:

1. Read and study assigned chapters from the A.S.M.E. Standard 1994 and understand the procedures for measurements with various tools.
2. Be tested on assigned readings, symbols, dimensions, and features of coordinate measurements made with metrology tools and features and be assigned drawings.
3. Select and visit various sites using C.M.M. practices, observing methods of inspection (metric and U.S. systems) with C.M.M. machines and support measurement tools and gages.
4. Utilize the surface plates to measure angular units and perpendicularity parallelism with required accuracy in metric and U.S. systems.
5. Measure assigned parts from prints to verify correct dimensions with micrometers, calipers, and comparators.

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.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.

Writing
0 - 0%

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

Homework problems, Field work, Lab reports, Quizzes, Exams

Problem solving
15 - 20%

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

Class performances, Field work, Performance exams

Skill Demonstrations
15 - 20%

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

Multiple choice, True/false, Matching items, Completion

Exams
45 - 55%

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

FIELD AND LAB REPORTS

Other Category
10 - 15%

Representative Textbooks and Materials:

Dimensioning and Tolerancing, The American Society of Mechanical Engineers, ASME Y14.5M-1998

