

## EICC COURSE DEVELOPMENT MODEL (CDM)

**CATALOG COURSE NUMBER:** MFG-105

**COURSE TITLE:** Machine Shop Measuring

Originating College: CCC MCC SCC

Effective Term/Year: Spring 2015

Initiating Faculty Member: Kenneth Darmody

Initiating Department Coordinator: Ben Kettering

**Reason for submission: Check all that apply**

New Course    If yes, type of course:

**A&S**

To be considered for General Education?  Yes  No Category:

To be part of an A & S Concentration?  Yes  No Concentration:

CTE Program Title:     Required  Elective

General Education or Program Review     Reactivation of an inactive course     Making course inactive

Changing course; please explain:

Other; please explain:

**Contact Hours/Distribution of Contact Hours**

**Lecture Hours**

**Lab Hours**

**Clinical Hours**

**Coop Hours**

Hours per Week:    1.00    Hours per Week:    4.00    Hours per Week:    0    Hours per Week:    0

Number of Weeks:    16.50    Number of Weeks:    16.50    Number of Weeks:    16.50    Number of Weeks:    16.50

*\*\*Note: If offering a course for the full fall or spring semester, the number of weeks is 16.5*

Total Lecture Hrs:    19.80    Total Lab Hrs:    79.20    Total Clinical Hrs:    0    Total Coop Hrs:    0

**Semester Hours Credit:** 3.00    if variable credit, give range:

Allow repeat\* for credit:  Yes  No

If yes, total course repeats allowed:    If yes, total credits:

\*Note that repeat for credit means a student can pass the course and then repeat it for additional credit. An internship course is an example of a course that could be set up as repeatable for additional credit

**Course or courses this CDM replaces, if any:**

**CATALOG COURSE DESCRIPTION:** This course will cover a variety of precision measurement devices that are used in manufacturing processes. These devices include machinist's scale, dividers, spring calipers, combination square, hermaphrodite calipers, vernier calipers, dial calipers, digital caliper, micrometers, depth micrometers, surface gauge, dial indicators, gauge blocks, height gauges and sine bar. Emphasis will be placed on how the student will accurately use these devices in the laboratory situation.

**RECOMMENDED ENTRY LEVEL SKILLS/KNOWLEDGE:**

**PRE-REQUISITE COURSES**

CCN#	COURSE TITLE
MFG 186	Plant Safety
MAT 733	Math for Technologies A

**CO-REQUISITE COURSES**

CCN#	COURSE TITLE

**PUBLISHED MATERIAL(S) USED FOR CDM DEVELOPMENT:** Kibbe, Richard, John Neely, Warren White, and Roland Meyer. Machine Tool Practices. Upper Saddle River, NJ: Prentice Hall, 2010. Print.

In general it is expected that source material will be dated within 5 years of this CDM date. If all materials/ textbooks cited above are older than this, please explain:

### **GENERAL COURSE GOALS**

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

Name and explain the use of common measuring devices used in the manufacturing setting.  
Use machinist scales, dividers, spring calipers, combination square, hermaphrodite calipers, surface guage, micrometers, vernier calipers, dial calipers, digital calipers, telescoping guages, depth micrometers, dial indicators, guage blocks, height guage and sine bar.

### **TOPICAL OUTLINE**

1. Machinist Scales
2. Dividers
3. Spring Calipers
4. Combination Square
5. Hermaphrodite Calipers
6. Surface Gage
7. Identifying Surface Finishes
8. Micrometers
9. Calipers: Vernier, Dial and Digital
10. Telescoping Gages
11. Depth Micrometers
12. Dial Indicators
13. Gage Blocks
14. Height Gage
15. Sine Bar

### **COURSE OBJECTIVES**

Upon successful completion of the course, a student should be able to:

1. Machinist Scales
  - a. Identify various graduations of metric and inch rules and their application.
  - b. Apply industrial standards in typical machine shop measurements.
  - c. Use machinist scales.
2. Dividers
  - a. Use spring dividers and trammels in layout work.
3. Spring Calipers
  - a. Identify spring calipers.
4. Combination Square
  - a. Use the combination square.
5. Hermaphrodite Calipers
  - a. Use hermaphrodite calipers.
6. Surface Gage
  - a. Identify the standard uses for surface gages.
  - b. Transfer a dimension to a surface.
  - c. Locate the center of a vertical surface on a workpiece.
7. Identifying Surface Finishes
  - a. Identify various kinds of surface finish measuring instruments.
  - b. Use a micro finish comparator to determine the surface roughness of sample workpieces.
  - c. Identify surface finish types and their applications.
8. Micrometers
  - a. Identify types of micrometers.
  - b. Measure and record dimensions using outside micrometers to an accuracy of +/- 0.001 inches.
  - c. Measure and record diameters using an inside micrometer to an accuracy of +/- 0.001 inches.

9. Calipers: Vernier, Dial and Digital

- a. Identify types of calipers.
- b. Measure and record dimensions to an accuracy of +/- 0.001 inches with:
  - 1. Vernier caliper
  - 2. Dial caliper
  - 3. Digital caliper
- c. Measure and record dimensions to an accuracy of +/- 0.02 mm with a:
  - 1. Vernier caliper
  - 2. Dial caliper
  - 3. Digital caliper
- d. Measure and record dimensions using a:
  - 1. Vernier caliper
  - 2. Dial caliper
  - 3. Digital caliper

10. Telescoping Gages

- a. Transfer a dimension from a workpiece with a telescoping gage.
- b. Measure the gage with a micrometer or caliper.

11. Depth Micrometers

- a. Measure and record depth dimensions using a depth micrometer to an accuracy of +/- 0.001 inches.
- b. Measure and record depth dimensions using a depth micrometer to an accuracy of +/- 0.02 mm.

12. Dial Indicators

- a. Identify standard procedures for the handling, setup, and reading of various types dial indicators.

13. Gage Blocks

- a. Describe the procedures for care and maintenance of gage blocks to insure their continued accuracy.
- b. Wire gage blocks together correctly.
- c. Disassemble gage block combinations and prepare the blocks properly for storage.
- d. Calculate combinations of gage block stacks with and without wear blocks.

14. Height Gage

- a. Demonstrate the ability to set up a height gage for a specific measurement.
- b. Demonstrate the ability to scribe a specific measurement to a work piece.

15. Sine Bar

- a. Calculate the correct gage block height for a specific angle to set up a sine bar.
- b. Set up a sine bar on a machine.

**RECOMMENDED METHODS OF INSTRUCTION:** Check all appropriate methods of instruction to facilitate student learning of course objectives.

- |   |  |   |
|---|--|---|
| <input type="checkbox"/> Case Studies   |  | <input type="checkbox"/> Class Discussions                  |
| <input type="checkbox"/> Computer lab work                                    |  | <input checked="" type="checkbox"/> Computer-assisted tools |
| <input type="checkbox"/> Computer-assisted writing                            |  | <input type="checkbox"/> Conducting experiments             |
| <input checked="" type="checkbox"/> Demonstration or modeling                 |  | <input type="checkbox"/> Electronic interaction             |
| <input type="checkbox"/> Field observation                                    |  | <input type="checkbox"/> Field trips                        |
| <input type="checkbox"/> Guest speaker  |  | <input checked="" type="checkbox"/> Guided practice         |
| <input type="checkbox"/> In-class writing or editing workshops                |  | <input type="checkbox"/> Journals                           |
| <input checked="" type="checkbox"/> Lecture                                   |  | <input type="checkbox"/> Library instruction and resources  |
| <input type="checkbox"/> Model building                                       |  | <input type="checkbox"/> Peer review                        |
| <input type="checkbox"/> Readings   |  | <input type="checkbox"/> Role play                          |
| <input type="checkbox"/> Service learning                                     |  | <input type="checkbox"/> Simulation                         |
| <input checked="" type="checkbox"/> Student and instructor conferences        |  | <input type="checkbox"/> Student collaborative learning     |
| <input type="checkbox"/> Student presentation                                 |  | <input checked="" type="checkbox"/> Student projects        |
| <input type="checkbox"/> Tests or quizzes                                     |  | <input type="checkbox"/> Worksheets/surveys                 |
| <input type="checkbox"/> Writing assignments/exercises (graded or not)        |  |   |
| <input checked="" type="checkbox"/> Other (please list specifics): Videotapes |  |   |

**RECOMMENDED EVALUATION METHODS:** Check all appropriate methods of evaluation to assess student achievement of course objectives.

- |  |  |   |
|--|--|---|
| <input type="checkbox"/> Class workshops                   |  | <input type="checkbox"/> Classroom discussions/participation  |
| <input type="checkbox"/> Collaborative work                |  | <input checked="" type="checkbox"/> Demonstration of skill(s) |
| <input checked="" type="checkbox"/> Individual conferences |  | <input type="checkbox"/> Journals                             |
| <input type="checkbox"/> Laboratory reports                |  | <input type="checkbox"/> Oral presentations                   |
| <input type="checkbox"/> Portfolios                        |  | <input type="checkbox"/> Pretest/Posttest                     |
| <input checked="" type="checkbox"/> Quizzes                |  | <input type="checkbox"/> Reading responses                    |
| <input type="checkbox"/> Student presentations             |  | <input checked="" type="checkbox"/> Student projects          |
| <input checked="" type="checkbox"/> Tests                  |  | <input type="checkbox"/> Writing Assignments                  |
| <input type="checkbox"/> Other (please list specifics):    |  |   |

**ATTENDANCE:** Policies on attendance will be formulated by the instructor and communicated to the students on the course syllabus.

**ACADEMIC DISHONESTY:** Policies on academic dishonesty can be found in the EICC student code of conduct published in the student handbook.

<b>CDM CREATION/REVIEW/REVISION INFORMATION</b>	
Originally Written by:	Date:
Department Chair, Comments, & Date:	
Does similar curriculum exist at other EICC Colleges? <input type="checkbox"/> CCC <input type="checkbox"/> MCC <input type="checkbox"/> SCC <input type="checkbox"/> No	
If yes, Counterparts Consulted, College, Comments & Date:	
<b>CDM Review or Revision Date:</b>	
Faculty member(s) & College:	
Does similar curriculum exist at other EICC Colleges? <input type="checkbox"/> CCC <input type="checkbox"/> MCC <input type="checkbox"/> SCC <input type="checkbox"/> No	
Changes made to course which will require further review steps:	
<input type="checkbox"/> Making course inactive <input type="checkbox"/> Credit hours <input type="checkbox"/> Contact hours <input type="checkbox"/> Course Description	
<input type="checkbox"/> 25% or more of course objectives <input type="checkbox"/> Other minor revisions or no revisions	
Dean Review, Comments & Date:	
<b>If changes made require further review and approval:</b>	
College Curriculum Committee Sign-off & Date:	
IC Review Subcommittee Sign-off & Date:	
Instructional Council Approval:	