

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE  
MASTER SYLLABUS

**GEOMETRICS & COORDINATE MEASURING  
MET 2310**

**Class Hours: 3.0**

**Credit Hours: 4.0**

**Laboratory Hours: 3.0**

**Date Revised: Spring  
00**

**Catalog Course Description:**

A course in state-of-the-art methods of metrology with emphasis on geometric dimensioning and tolerancing (GD&T) and computer-assisted coordinate measuring (CMM).

**Entry Level Standards:**

Students entering this course should have fundamental knowledge of geometry, trigonometry, basic manufacturing and drawing practices to include blueprint reading and the use of AutoCAD.

**Prerequisites:**

CID 1100, MET 1020

**Textbook(s) and Other Reference Materials Basic to the Course:**

Textbook:

*Geometric Dimensioning and Tolerancing:* Neumann & Associates, 1995.

ANSI Y14.5M-1994 *Dimensioning and Tolerancing:* American Society of Mechanical Engineers.  
(Reaffirmed in 1999)

References:

*Geometric Dimensioning and Tolerancing:* Madsen, Goodheart-Willcox Company, 1988.

*Uni-Touch Plus Operator's Manual:* NUMEREX Corporation, 1992.

**I. Week/Unit/Topic Basis:**

<b>Week</b>	<b>Topic</b>
1	Introduction; Theory & Rules
2	Symbols, Feature Control Frames, Material Conditions
3	Symbols, Feature Control Frames, Material Conditions (cont.)
4	Datums - Basics; LAB Position - Basics; Standard Gaging Methods; Standard Gaging Lab Exercise
5	Datums - Basics; LAB Position - Basics; Standard Gaging Methods; Standard Gaging Lab Exercise (cont.)
6	LAB Standard Gaging Lab Exercise; Coordinate Measuring - Basics
7	Form Tolerances; LAB Coordinate Measuring - Basics; Coordinate Measuring

	Practice
8	Orientation Tolerances; LAB Coordinate Measuring Practice
9	Profile Tolerances; LAB Coordinate Measuring - Programming; Coordinate Measuring Practice
10	Coaxiality; LAB Coordinate Measuring - Programming; Coordinate Measuring Practice
11	Datums & Position - Advanced; LAB Coordinate Measuring/GDT Characteristics; Coordinate Measuring Practice
12	Datums & Position - Advanced; LAB Coordinate Measuring/GDT Characteristics; Coordinate Measuring Practice (cont.)
13	Fixed & Floating Fasteners; LAB Coordinate Measuring Practice
14	LAB Coordinate Measuring - Programming; Coordinate Measuring Practice
15	LAB Coordinate Measuring - Programming; Coordinate Measuring Practice (cont.)
16	LAB; CMM Final Evaluation

## II. Course Objectives\*:

- A. Demonstrate their understanding of GDT principles. I, II
- B. Measure and analyze a part using standard gauging techniques. II, III, V
- C. Measure and analyze a part using CMM techniques. II, III, V
- D. Communicate technical information. IV

\*Roman numerals after course objectives reference goals of the Engineering and Media Technologies department.

## III. Instructional Processes\*:

Students will:

1. Participate in lecture discussions and lab activities that develop and reinforce an understanding of the theories, concepts, and principals of GDT.  
*Problem Solving and Decision Making Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*
2. Produce an appropriate CAD drawing of an actual part that applies GDT Characteristics, Feature Control Frames, Material Conditions, and Datums.  
*Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Information Literacy Outcome, Active Learning Strategies, Transitional Strategy*
3. Collect data from a manufactured item using standard manual gauging methods and devices.  
*Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*
4. Create, write, and edit a CMM program to collect data from a part using computer-

assisted methods. *Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

5. Analyze, tabulate, and present collected data in an orderly format.  
*Problem Solving and Decision Making Outcome, Technological Literacy Outcome, Numerical Literacy Outcome, Information Literacy Outcome, Active Learning Strategies*

\*Strategies and outcomes listed after instructional processes reference Pellissippi State's goals for strengthening general education knowledge and skills, connecting coursework to experiences beyond the classroom, and encouraging students to take active and responsible roles in the educational process.

#### **IV. Expectations for Student Performance\*:**

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

1. Define, explain, and associate the terminology used in GDT. A
2. Identify and associate the various GDT symbols. A
3. Dimension and tolerance parts in accordance with ASME Y14.5M specifications. A
4. Setup and collect data using standard gauging techniques. B
5. Tabulate results and "accept or reject" part. B,C,D
6. Operate and set-up CMM. C
7. Align part, create geometric elements, and collect data using computer-assisted techniques. C
8. Edit CMM program. C
9. Locate and extract needed information from ASME standard and operational/programming manuals. D
10. Document technical information in a neat and orderly format. D
11. Complete assignments based on written and oral instructions. D

\*Letters after performance expectations reference the course objectives listed above.

#### **V. Evaluation:**

##### A. Testing Procedures:

Quizzes--35 points

Approximately 7-10 quizzes will be administered during the course. They will include discussion questions, short answer questions, true/false questions, and problem solving.

##### B. Laboratory Expectations:

N/A

##### C. Field Work:

Project 1: Standard Gauging & Analysis--20 points

Project 2: CMM Gauging & Analysis

Report--20 points

Operational Evaluation--15 points

Guidelines and requirements for each project will be provided by the instructor.

D. Other Evaluation Methods:

Participation--10 points

Based on instructor observation during the course, each student will be evaluated on participation activities. Evaluation parameters to include active participation in class discussions, being prepared, efficient use of lab time, striving to achieve more than minimum requirements, and regular attendance.

E. Grading Scale:

A 92-100

B+ 88-91

B 83-87

C+ 79-82

C 74-78

D 65-73

F Below 65

**VI. Policies:**

A. Attendance Policy:

Pellissippi State Technical Community College expects students to attend all scheduled instructional activities. As a minimum, students in all courses must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course (Pellissippi State Catalog). Individual departments/programs/ disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent.

B. Academic Dishonesty:

Cheating on a quiz or assigned project will not be tolerated. First offense will result in immediate dismissal and automatic failure of the course. Assistance from other students is encouraged during the learning stages of the course, but each student is responsible for completing their own course assignments.

C. Other Policies:

Make-Up Quizzes: As a general rule, no make-up quizzes will be administered during the course.

Safety and Equipment Abuse: Repeated safety violations will result in a reduction of final grade, at the instructor's discretion. Flagrant violations which result in equipment damage or personal injury will result in automatic failure of the course.

Counseling: Counseling is available during posted office hours or by appointment.