

PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS

**GEOMETRICS & COORDINATE MEASURING  
MET 2310**

**Class Hours: 3.0**

**Credit Hours: 4.0**

**Laboratory Hours: 3.0**

**Revised: Spring 2011**

**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, and AutoCAD or SolidWorks.

**Prerequisites:**

ENGT 1010 and ENGT 1100 and MET 1022

**Textbook(s) and Other Course Materials:**

**Textbook:**

*GD & T Application and Interpretation:* Bruce A. Wilson, Goodheart-Willcox Company, Latest Edition.

**References:**

*ASME Y14.5M-2009 Dimensioning and Tolerancing: American Society of Mechanical Engineers* or Latest Edition.

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

*MCAT-C1 CMM Operation Manual:* Mitutoyo Corp., 2004.

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

<b>Week</b>	<b>Topic</b>
1	Introduction Theory & Rules
2-3	Symbols Feature Control Frames Material Conditions
4-5	Datums - Basics Position - Basics Standard Gaging Methods

	Standard Gaging Lab Exercise
6	Standard Gaging Lab Exercise Coordinate Measuring - Basics
7	Form Tolerances Coordinate Measuring - Basics Coordinate Measuring Practice
8	Orientation Tolerances Coordinate Measuring Practice
9	Profile Tolerances Coordinate Measuring - Programming Coordinate Measuring Practice
10	Coaxiality Coordinate Measuring - Programming Coordinate Measuring Practice
11-12	Datums & Position - Advanced Coordinate Measuring/GD&T Characteristics Coordinate Measuring Practice
13	Fixed & Floating Fasteners Coordinate Measuring Practice
14	Coordinate Measuring – Programming
15	CMM Final Performance Evaluation

## II. Course Goals\*:

The course will:

- A. Enhance understanding of the basic principles of geometric dimensioning and tolerancing. (I, II, IV, V)
- B. Develop knowledge and skills to measure and analyze a part using standard gaging techniques. (I, II, IV, V)
- C. Develop knowledge and skills to measure and analyze a part using CMM techniques. (I, II, IV, V)
- D. Enhance skills to communicate technical information. (III)

\* Roman numerals after Course Goals reference Engineering Technology Program Goals.

## III. Expected Student Learning Outcomes\*:

The student will be able to:

1. Define, explain, and associate the terminology used in GD&T. (A)
2. Identify and associate the various GD&T 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)

\* Capital letters after Expected Student Learning Outcomes reference the Course Goals listed above.

#### **IV. Evaluation:**

Evaluation of both classroom and laboratory work is required in this course. Total evaluation will be based on the following point distribution.

##### 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:

Project 1: Standard Gauging & Analysis (20 Points)

Project 2: CMM Gauging & Analysis

GD&T Application Exercise (10 Points)

Report (15 Points)

Operational Evaluation (10 Points)

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

##### C. Field Work:

N/A

##### 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:

Final grade for this course will be based on the following alphabetic/numerical scale.

A 93-100  
B+ 88-92  
B 83-87  
C+ 79-82  
C 74-78  
D 65-73  
F Below 65

## V. Policies:

### A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of the Learning Division, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of the Learning Division.

### B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or other classroom assignments unless explicitly authorized by the instructor.
- Any of the above occurring within the Web or distance learning environment.

### C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at [www.pstcc.edu/departments/swd/](http://www.pstcc.edu/departments/swd/)

### D. Other Policies:

**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.