

PELLISSIPPI STATE COMMUNITY COLLEGE  
MASTER SYLLABUS

GEOMETRICS & COORDINATE MEASURING  
MET 2310

Lecture/Lab Hours: 4

Credit Hours: 4

Date Revised: Spring 2017

**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).

**Prerequisites**

None

**Co-requisites**

None

**Textbooks and Other Supplies**

**Textbook:** *None*

**References:** *Geometric Dimensioning and Tolerancing*: Madsen, Goodheart-Willcox Company, Latest Edition.  
*ASME Y14.5M-2009 Dimensioning and Tolerancing*: American Society of Mechanical Engineers or Latest Edition.  
*MCAT-CI CMM Operation Manual*: Mitutoyo Corp., 2004

**Week/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

### **Engineering Technology General Outcomes (Educational objectives)**

- I. Apply basic engineering theories and concepts creatively to analyze and solve technical problems.
- II. Utilize with a high degree of knowledge and skill equipment, instruments, software, and technical reference materials currently used in industry.
- III. Communicate effectively using developed writing, speaking, and graphics skills.
- IV. Assimilate and practice the concepts and principles of working in a team environment.
- V. Obtain employment within the discipline or matriculate to a four year program in engineering or industrial technology.

### **Engineering Technology Concentration Competencies**

NOTE: At the program level all 6 competencies apply to roman numerals I – V of the Engineering Technology General Outcomes (Educational objectives) listed above.

Students will

- A. Apply the knowledge, techniques, skills, and modern tools for the concentration of study to specifically defined engineering technology activities.
- B. Demonstrate the knowledge of mathematics, science, engineering and technology to engineering technology problems using developed practical knowledge.
- C. Conduct and report the results of standard tests and measurements, and conduct, analyze and interpret experiment or project results.
- D. Function effectively as a member of a technical team.
- E. Identify, analyze and solve specifically defined engineering technology-based problems.
- F. Employ written, oral and visual communication in a technical environment.

### **Course Goals**

NOTE: Capital letters after course goals reference goals of the Engineering Technology Program.

The course will

- 1. Enhance understanding of the basic principles of geometric dimensioning and tolerancing. (A,B,C,E,F)
- 2. Develop knowledge and skills to measure and analyze a part using standard gauging techniques. (A,B,C,E,F)
- 3. Develop knowledge and skills to measure and analyze a part using CMM techniques. (A,B,C,E,F)
- 4. Enhance skills to communicate technical information. (C,F)

### **Expected Student Learning Outcomes**

NOTE: Numbers after Expected Student Learning Outcomes reference the course goals listed above.

The student will

- a. Define, explain, and associate the terminology used in GD&T. (1)
- b. Identify and associate the various GD&T symbols. (1)
- c. Dimension and tolerance parts in accordance with ASME Y14.5M specifications. (1)
- d. Setup and collect data using standard gauging techniques. (2)
- e. Tabulate results and "accept or reject" part. (2, 3, 4)
- f. Operate and set-up CMM. (3)
- g. Align part, create geometric elements, and collect data using computer-assisted techniques. (3)
- h. Edit CMM program. (3)
- i. Locate and extract needed information from ASME standard and operational/programming manuals. (4)
- j. Document technical information in a neat and orderly format. (4)
- k. Complete assignments based on written and oral instructions. (4)

### **Evaluation**

Total evaluation will be based on the following point distribution.

### **Testing Procedures**

**Quizzes** **35 points**

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

**Project 1: Standard Gauging and Analysis** **20 Points**

Homework will be assigned throughout the semester. Late homework will not be accepted

**Project 2: CMM Gauging and Analysis,**

GD&T Application Exercise **10 Points**

Report **15 points**

Operational Evaluation **10 points**

**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.

### **Laboratory Experiences**

N/A

### **Field Work**

N/A

### **Other Evaluation Methods**

N/A

### **Grading Scale**

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

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

### **Policies**

## **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 Academic Affairs, 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 Academic Affairs.

## **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.

Please see the Pellissippi State Policies and Procedures Manual, Policy 04:02:00 Academic/Classroom Conduct and Disciplinary Sanctions for the complete policy.

## **Accommodations for Disabilities**

Students that 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 Disability Services (DS) in order to receive accommodations in this course. [Disability Services](#) (<http://www.pstcc.edu/sswd/>) may be contacted via [Disability Services email](#) or by visiting Alexander 130.

## **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 could result in automatic failure of the course.