

PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE  
MASTER SYLLABUS

**ADVANCED MECHANICAL DRAWING W/LAB  
CID 1220**

**Class Hours: 3.0**

**Credit Hours: 4.0**

**Laboratory Hours: 3.0**

**Revised: Spring 05**

NOTE: This course is not designed for transfer credit.

**Catalog Course Description:**

An introduction to MicroStation CAD software and a continuation of mechanical drawing practices. This course covers basic commands, 3-D commands, file manipulations, cells, symbology, and dimensioning. Descriptive Geometry (auxiliary views, intersections, developments, and flat pattern layouts), ANSI standard Y.14 dimensioning and tolerancing and simple assembling drawing are also covered.

**Entry Level Standards:**

Students entering this course should have mastered the basic principles of good drafting including orthographic projections, sectional views, auxiliary views and dimensioning. Students should have already developed a grasp of trigonometric and geometric concepts.

**Prerequisite:**

CID 1100 and 1105

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

*Harnessing MicroStation V8 J*, Krishnan, G.V., Taylor, and Rhea, Delmar Press, 2003.  
*Geometric Dimensioning & Tolerancing*, Madsen, David, Goodheart-Willcox Press, 2003.  
Instructor supplied materials

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

This schedule is a guide and may vary slightly, depending on the progress of the class.

<b>Week</b>	<b>Topic</b>
1	Use of Graphic Primitives
2	Placing Text, Data Fields, and Tags
3	Element Modification & Use of Levels
4	Measurement and Dimensioning
5	Descriptive Geometry
6	Creation and Use of Drawing Sheets

7	Creation and Use of Cells
8	Patterning
9	Creation and Use of Reference Files
10	ANSI Standard Dimensioning and Tolerancing
11	Three Dimensional Modeling
12	Construct auxiliary views working with descriptive geometry projections
13-14	Construct and develop models from flat pattern layout drawings for developments
15	Final Exam

## II. Course Objectives\*:

- A. Use MicroStation drawing commands to make professional drawings. (a,d,g)
- B. Construct auxiliary views working with intersections of planes and surfaces. (a,d)
- C. Construct and develop models from flat pattern layout drawings for developments. (a,g)
- D. Develop and understand acceptable ANSI dimensioning and tolerancing practices used in production. (g)
- E. Understand the philosophy of three-dimensional modeling. (d)
- F. Understand how to surface three-dimensional models using MicroStation. (a,d)
- G. Understand the steps necessary to produce production drawings from a three dimensional model. (a,b)

\* Letters (a-k) after course objectives reference CID Program Outcomes (as required by ABET).

## III. Instructional Processes\*:

Students will:

1. Use the "graphic primitives" of MicroStation to produce any desired line, linestring circle, arc, etc. *Mathematics Outcome, Technological Literacy Outcome*
2. Visualize an object and determine the best approach to creating a three dimensional model representing the object and create the desired complex shapes (chained to single elements) to create the above mode. *Technological Literacy Outcome, Natural Sciences Outcome, Active Learning Strategies*
3. Create cells of frequently used details and use these cells to eliminate repetitive drawing and create reference files and use reference files in producing production drawing. *Transitional Strategy, Active Learning Strategies*
4. Compress a three dimensional model back to two dimension to create production drawing. *Mathematics Outcome, Technological Literacy Outcome, Active Learning Strategies*
5. Use dimensioning tools to completely and properly dimension final drawings as well as use

annotation tools to completely annotate final drawing. *Technological Literacy Outcome, Communication Outcome*

6. Demonstrate comprehension of terminology used in association with auxiliary views and use computer to produce report as assigned. Such reports will contain proper English, use complete sentences, and contain correct spelling. *Communication Outcome, Technological Literacy Outcome, Transitional Strategy*
7. Show plotting of curves in auxiliary views and understand use of hidden lines in auxiliary views and develop auxiliary sectional views and understand principles of intersections for developments. *Natural Sciences Outcome, Active Learning Strategies*
8. Show intersection of plane and cylinder in development of flat pattern or cylinders and in developments of planes and oblique prisms, cylinders and cones by use of models. *Active Learning Strategies, Mathematics Outcome*

\*Strategies and outcomes listed after instructional processes reference TBR'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. Set software and environment variable to create seed file. A
2. Use fundamental MicroStation commands to place, modify, manipulate, and delete elements. A
3. Use Accudraw and Smartline with fundamental commands. A
4. Knowledge of element selection, fence manipulation, and view attributes. A
5. Place text, data fields, and tags. A
6. Place dimensions. A
7. Create cells and cell libraries. A
8. Attach and manipulate reference files. A
9. Place set menu for patterns. A
10. Determine the true length of the line. B
11. Locate the point view of true length of the line. B
12. Show the edge view of the surface. B
13. Solve for the true shape of the surface. B
14. Develop a truncated prism using parallel line development. C
15. Create a truncated pyramid using radial line development. C
16. Develop a truncated cylinder using parallel line development. C

17. Create a truncated cone sing radial line development. C
18. Know how to read and understand the meaning of Geometric Dimensioning & Tolerancing (GD&T) symbols and terms. D
19. Understand planar and target datums as they relate to GD&T. D
20. Utilize flatness, straightness, circularity, and cylindricity GD&T controls to control form. D
21. Utilize perpendicularity, angularity, and parallelism GD&T controls to control the orientation of parts. D
22. Understand concentricity, symmetry, runout, and profile controls and where to use them. D
23. Create a 3 dimensional design file. E
24. Understand the design cube and 3D precision inputs. E
25. Set display and active depths in the process of 3D drafting. E
26. Define, rotate, move, select and save auxiliary coordinate systems. E
27. Master 3D primitive commands. F
28. Create solid and surface 3D elements. F
29. Change the status of 3D elements form solid to surface and vise versa. F
30. Project and revolute 2D complex shapes to create 3D objects. F
31. Create composite solids by using union, intersection, and difference operations. F
32. Construct fillets and chamfers between surfaces. F
33. Utilize sheet views to create 2 dimensional front view from the models. G
34. Fold the front view to create all other necessary views. G
35. Attach an auxiliary view. G
36. Place hidden lines for all views. G
37. Reference a border and dimension within the sheet view or sheet file. G
38. Utilize the model to reference individual parts to create an assembly drawing. G

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

## **V. Evaluation:**

### A. Testing Procedures: 70% of grade

Two Exams will be given during the semester with each counting for 30% of the total grade. A number of quizzes will be given at the discretion of the instructor counting for 10% of the total grade.

Mid-term exam: 30% of total grade

Final exam: 30% of total grade  
Quizzes: 10% of total grade

B. Laboratory Expectations: 30% of grade

Students will be evaluated on the correctness of their drawings/work and on final set of working drawings of a project.

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

E. Grading Scale:

A	90 -- 100
B+	86 -- 89
B	80 -- 85
C+	76 -- 79
C	70 -- 75
D	60 -- 69
F	< 60

**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. Individual departments/programs/disciplines, with the approval of the vice president of Academic and Student Affairs, may have requirements that are more stringent. Class Attendance for Lab: Attendance is required to all lab sessions unless excused by the instructor. Students missing more than four unexcused sessions will receive an "F" and no credit will be received. Students tardy past half an hour will be considered absent.

B. Academic Misconduct:

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. In addition to other possible disciplinary sanctions that may be imposed as a result of academic misconduct, the instructor has the authority to assign either (1) an F or zero for the assignment or (2) an F for the course.

C. Accommodations for Disabilities:

If you need accommodations because of a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please inform the instructor immediately (privately after class or in the instructor's office). To request accommodations, students must register with Services for Students with Disabilities Office located in J.L. Goins Administration Building, Room 127 or 131 or by

phone: (865) 539-7153 or (865) 694-6751 Voice/TTD.