PELLISSIPPI STATE TECHNICAL COMMUNITY COLLEGE
MASTER SYLLABUS

ADVANCED MECHANICAL DRAWING
CID 1220

Class Hours: 3.0  Credit Hours: 4.0
Laboratory Hours: 3.0  Date Revised: Summer 01

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

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

Instructor supplied materials

I. Week/Unit/Topic Basis:

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

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Use of Graphic Primitives</td>
</tr>
<tr>
<td>2</td>
<td>Placing Text, Data Fields, and Tags</td>
</tr>
<tr>
<td>3</td>
<td>Element Modification &amp; Use of Levels</td>
</tr>
<tr>
<td>4</td>
<td>Measurement and Dimensioning</td>
</tr>
<tr>
<td>5-6</td>
<td>Descriptive Geometry</td>
</tr>
<tr>
<td>7</td>
<td>Creation and Use of Drawing Sheets</td>
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</tbody>
</table>
II. Course Objectives*:

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

*Roman numerals after course objectives reference goals of the CID program.

III. Instructional Processes*:

Students will:

1. Use the "graphic primitives" of MicroStation to produce any desired line, linestring circle, arc, etc. Numerical Literacy 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, Problem Solving and Decision Making 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. Numerical Literacy 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. *Problem Solving and Decision Making 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, Numerical Literacy Outcome*

*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. 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 using 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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
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<tbody>
<tr>
<td>A</td>
<td>90 -- 100</td>
</tr>
<tr>
<td>B+</td>
<td>86 -- 89</td>
</tr>
<tr>
<td>B</td>
<td>80 -- 85</td>
</tr>
<tr>
<td>C+</td>
<td>76 -- 79</td>
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<tr>
<td>C</td>
<td>70 -- 75</td>
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<tr>
<td>D</td>
<td>60 -- 69</td>
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<tr>
<td>F</td>
<td>&lt; 60</td>
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VI. Policies:

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.