Las Positas College
3000 Campus Hill Drive
Livermore, CA 94551-7650
(925) 424-1000
(925) 443-0742 (Fax)

Course Outline for DSNT 62A

COMPUTER AIDED DRAFTING (CAD)

Effective: Fall 2002

I. CATALOG DESCRIPTION:
DSNT 62A — COMPUTER AIDED DRAFTING (CAD) — 3.00 units

Introduction to the basic understanding of Computer Aided Drafting, with emphasis on user terminology and exposure to various types of CAD systems, hardware, and associated software. How to set up drawings, create geometric shapes and constructions to form multiviews, and use special editing operations that increase productivity.

1.50 Units Lecture 1.50 Units Lab

Prerequisite
DSNT 52 - Technical Graphics

Grading Methods:
Letter or P/NP

Discipline:

	MIN
Lecture Hours:	27.00
Lab Hours:	81.00
Total Hours:	108.00

II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 2

III. PREREQUISITE AND/OR ADVISORY SKILLS:

Before entering the course a student should be able to:

A. DSNT52
1. describe engineering design process and concurrent engineering design approach;
2. list and describe 3-D (three-dimensional) modeling and analysis techniques used in design;
3. identify the traditional tools and associated terms used to create technical drawings;
4. identify and explain the function of the primary components of a CAD system;
5. demonstrate correct hand and CAD-lettering practices as well as knowledge of linetypes;
6. understand the importance of sketching and how it integrates into the design process;
7. develop visualization skills to clearly represent and control mental images;
8. explain and construct geometry and geometric conditions that occur between entities;
9. precisely maneuver in coordinate space within 2-D and 3-D coordinate systems;
10. create and edit multiview drawings using hand tools or CAD, solving elementary design problems;
11. create an isometric and/or oblique drawing or sketch;
12. explain auxiliary view projection theory and create auxiliary views of inclined planes;
13. use fundamental descriptive and spacial geometry methods to analyze graphic models;
14. apply cutting planes to create section views using conventional practices;
15. apply standard dimensioning and tolerancing notations to mechanical drawings;
16. identify and draw geometric dimensioning and tolerancing symbols;
17. develop a basic understanding of fastening devices, manufacturing tools, production processes, and their effects on the finished product;
18. describe how working drawings provide data to make part or assembly of final design;
19. describe possible career paths in Design Technology and initiate résumé preparation.

IV. MEASURABLE OBJECTIVES:

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

A. identify CAD hardware and use it effectively to input drawing information;
B. use Windows Explorer to format disks and perform disk file manipulations such as copying, deleting, and finding files and folders;
C. develop preliminary planning strategies and sketches to optimize CAD efficiency;
D. set up drawing formats, use drawing aids, and apply display options productively;
E. construct accurate geometric shapes using absolute, relative and polar entry methods;
F. use object snap options effectively to create additional geometry on-the-fly;
G. determine command sequence required to select text style and placement;
H. select appropriate basic and advanced editing commands to modify existing entities;
I. construct and utilize layers, colors, and line types;

J. create and manage layouts, compatible with typical printer/plotter output devices;
K. utilize on-screen menu systems effectively;
L. create multiple patterns of drawing components;
M. obtain information about entities on the drawing;
N. construct multiview layouts with auxiliary views.

V. CONTENT:
A. CAD workstation components and function
B. Windows NT Operating System
1. Using Windows Explorer to manage and search for files and folders
2. File management procedures
3. Format and copy diskettes
C. Preparing to Draw
1. CAD drawing planning and philosophy
2. Appropriate locations for saving drawing files
3. Entering and Exiting CAD software from Windows desktop
4. Screen layout and user interface
5. Function of dialog boxes, keyboard, DesignCenter, HELP, function keys
D. Setup Options
1. Using Setup Wizards and templates
2. Changing drawing settings
E. Drawing Aids
1. Establishing a Grid
2. Cancelling, erasing, and other escape mechanisms
3. Setting up increments for cursor movement
4. Creating and using drawing templates
5. Saving, Opening, and Closing drawings
6. Object Snap Modes
F. Drawing Display options
1. How to magnify or move display window
2. Creating named views
3. Paper space vs. Model space environments
4. Creating multiple viewports in graphics window
5. Creating 3D viewports
G. Basic Drawing Operations
1. Line Conventions
2. Point Entry methods
3. Linetype Manipulations
4. Erasing Objects
5. Selection Sets
6. Drawing circles, arcs, and ellipses
7. Drawing polygons
8. Drawing points and geometric constructions
a. Setting running object snaps
b. Autosnap settings
c. Using temporary tracking to locate points
d. Using AutoTracking to locate points
H. Layer Strategy
1. Using Object Properties toolbar
2. Setting layer characteristics
3. Layer filters and controls
4. Changing Object Properties
5. Generating Plots
I. Drawing Multiviews and auxiliary views
1. Drawing construction lines and rays
2. Using point filters
J. Inserting Text
1. Text Standards and scale factors
2. Methods to draw text
3. Placement variables
4. Selecting Text font and style
5. Accessing special characters
6. Revising text or changing text
K. Plotting and Printing
1. Layout settings and plotting terms
2. Plot device selection and management
3. Plot styles and settings
L. Basic and Automatic Editing
1. Drawing chamfers and fillets
2. Removing a section from an object
3. Trimming and extending lines, circles, arcs
4. Changing Lines and circles
5. Moving, copying, mirroring, rotating, aligning, scaling, lengthening, and stretching objects
6. Automatic editing with Grips
7. Matching Properties
8. Multiple entities and pattern creation
9. Obtaining drawing data
10. Using polylines, traces, and multilines

VI. METHODS OF INSTRUCTION:
A. **Demonstration** -
B. individual consultation
C. **Audio-visual Activity** - Video demonstration and summaries as available and as time permits
D. **Written exercises and case studies** - Written exercises in conjunction with computer analysis
E. Textbook referrals and readings from periodicals
F. **Lecture** -
G. **Classroom Activity** - Hands-on activities and computer laboratory

VII. TYPICAL ASSIGNMENTS:

A. Reading: 1. Read the section on Layers in the textbook on pages 149-166. How do you easily select all the layers in the Layer Properties Manager dialog box list at the same time? 2. Read about drawing circles on pages 190-195. Identify how to access the option that allows you to draw a circle tangent to three objects. B. Laboratory assignments: 1. Construct the following fixture drawing on the graphics screen, naming it with “your initials” 5A. It is suggested that you start in the upper right-hand corner, creating the outline of the shape in a counterclockwise direction by counting grid marks. Use the fillet command to complete the corners. 2. Complete the drawing of the Flange shown as attached sheet. Setup the proper units, limits, and drawing aids. Draw the rectangle with the PLINE command and copy the pattern with the ARRAY command. The drawing should include centerlines. Insert a title block and plot. C. Written assignments: 1. Read chapter 3 on Introduction to Drawings, Saving Drawings, in the textbook and answer the chapter test questions on a separate sheet of paper. 2. View Video II, entitled “Getting Started” and answer the questions on the Video Summary. The video series is on reserve in the Learning Resources Center. In this video you will learn about controlling the command line’s size and location, keyboard shortcuts to speed up input, a variety of ways to save your work to disk, and a little about drawing aids, all of which we will discuss in class.

VIII. EVALUATION:

A. **Methods**

B. **Frequency**

1. Frequency:
   a. Weekly laboratory and written assignments
   b. 1 Midterm and 1 Final examination
   c. Weekly Quizzes
   d. Single critique of Notebook

IX. TYPICAL TEXTS:

1. Shumaker, Terence M. and Madsen, David A. *AutoCAD 2000/2000i and Its Applications.* ., Goodheart-Willcox Company, Inc., 2001.
2. Leach, James A. *AutoCAD 2000 Instructor*., McGraw-Hill, 2000.
3. Stellman, Thomas A. and Krishnan,G.V. *Harnessing AutoCAD 2000*., Autodesk Press /Thomson Learning, 2000.
4. Grabowski, Ralph *The Illustrated AutoCAD 2000 Quick Reference*., Autodesk Press/Thomson Learning, 2000.

X. OTHER MATERIALS REQUIRED OF STUDENTS:

A. Two 3 ½" diskettes
B. Computer use certificate
C. 3-ring notebook