

BI 0015 - MANAGING THE COMPUTER-AIDED DESIGN (CAD) ENVIRONMENT

Catalog Description

Formerly known as DES 40

Prerequisite: Completion of BI 8, ADVM 11 or BI 12 with grade of "C" or better, or equivalent as determined by instructor

Advisory: Completion of ADVM 3D with grade of "C" or better

Hours: 90 (36 lecture; 54 laboratory which may be scheduled TBA)

Description: Designed for the advanced Drafting and Engineering Support student. Topics include proper CAD management skills and the development of "as built" models used in the manufacturing, architectural and civil disciplines. Focus on utilizing, creating and instituting CAD standards, policies and procedures. Development of prototypes integral to the design process in their chosen area of concentration (mechanical, civil and/or architecture). (CSU)

Course Student Learning Outcomes

- CSLO #1: Apply various accepted industry drafting standards.
- CSLO #2: Operate a CAD system in line with current CAD standards.
- CSLO #3: Develop 3D working model (prototype) for use in the design process.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

90

Outside of Class Hours

72

Total Student Learning Hours

162

Course Objectives

This course requires 36 hours lecture and 54 hours laboratory. In some class sections, the 54 hours of laboratory may be scheduled "to be arranged" or "TBA." The TBA hours and objectives are expected of all students enrolled in the course.

Lecture Objectives:

I. The Role of the CAD Manager

1. Describe the role of the CAD Manager.
2. Describe what the CAD manager should know.
3. Describe issues that relate to the management of a CAD environment.

II. Naming Drawings and Creating Symbols

1. Describe the issues relative to file naming conventions.
2. Describe the appropriate steps to symbol creation.

III. Layer Names and Conventions

1. Describe the issues relative to layer naming.
 2. Compare and contrast the nationally recognized layer standards.
- IV. Fonts and Patterns, Linetypes and Weights
1. Describe the issues relative to the assignment of text fonts in drawings.
 2. Describe the issues relative to the usage of patterns within drawings.
 3. Describe the issues relative to linetypes and line weights within drawings.
- V. Scale Factors and Dimensions

1. Describe the issues relative to scale factors in a CAD environment.
2. Compare and contrast the international standards for dimensioning.

VI. Standard Drawings and Templates

1. Compare and contrast the international standards for drawing sheet sizes.
2. Compare and contrast the national standards for drawing borders and title blocks.

VII. Writing your CAD Standards Manual

1. Describe the elements that should be included in a CAD standards manual.

VIII. Archival of Drawings

1. Describe the processes employed in the archival of drawings.
2. Explain the issues relative to the archival of drawings.
3. Explain the issues relative to the conversion of drawings from one format to another.

IX. Handling Engineering Change Orders

1. Describe the ramifications of implementing post production engineering changes.
2. Discuss Engineering change documents.
3. Explain the importance of engineering change approvals.
4. Discuss the details of executing an engineering change order.
5. Describe the checks and balances that should be used in the engineering change process.

X. Model making – Prototyping

1. Discuss prototyping and the design process.
2. Discuss the specifications of models and prototypes.
3. Explain various methods of modeling and prototyping.
4. Discuss utilizing models and prototypes to assess and improve design.

Laboratory Objectives:

I. Naming Drawings and Creating Symbols

1. Develop and apply a file naming scheme to a local standard.
2. Develop a symbol library following accepted practices.

II. Layer Names and Conventions

1. Develop and apply a layer naming scheme to a local standard.
- III. Fonts and Patterns, Linetypes and Weights
1. Develop and apply a scheme for fonts to a local standard.
 2. Develop and apply a scheme for patterns to a local standard.
 3. Develop and apply a scheme for linetypes to a local standard.
 4. Develop and apply a scheme for line weights to a local standard.

IV. Writing your CAD Standards Manual

1. Develop a CAD standards manual for an engineering discipline.

V. Handling Engineering Change Orders

1. Utilize engineering change documentation.
- VI. Model making – Prototyping
1. Utilize the specifications of models and prototypes.
 2. Demonstrate various methods of modeling and prototyping.
 3. Utilize models and prototypes to assess and improve design.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)

- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Essay Examinations
 - Example: Q: Explain the differences between Industry CAD Standards and Industry Graphic Standards.
- Objective Examinations
 - Example: Given the international standards for drawing sheet sizes, identify the sheet sizes for each standard. a. ISO- b. ANSI- c. JIS- d. DIN-
- Projects
 - Example: Students develop a presentation quality, scaled, prototype model of an Architectural, Mechanical or Civil Design. The model is then presented in front of the class and a peer review follows. The instructor will assess a grade based on current industry standards.
- Skill Demonstrations
 - Example: Students demonstrate effective industry specific job seeking skills by means of a mock-job interview. Students demonstrate the skills of both being an interviewee and of an interviewer by rotating through random interview questions presented by a panel and response is made by interviewee. The instructor will assess the student's response to the questions and evaluate based on the provided rubric.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. The instructor will present several methodologies for developing engineering models and prototypes and then guide students in the development and building of said models and prototypes. (Laboratory Objective 6-2)

Lecture:

1. Instructor will present case studies of how companies maintain electronic drawings relative to daily needs for layering consistency and will lead students in the discussion and evaluation of the strategies for developing layer management standards. (Lecture Objective 3-2)

Distance Learning

1. Students in online classes participate, individually and in groups, in discussion boards and respond to weekly assignments via the Learning Management System. The instructor will provide documented material (including videos) explaining or exploring the course content and provide individual feedback on all assignments. The instructor will lecture on model-making and prototyping.

Students will then utilize models and prototypes to assess and improve designs. (Laboratory Objective 6-3)

Typical Out of Class Assignments Reading Assignments

Sample 1: After reading the assigned pages, the instructor will lead students in a group discussion on the the use of engineering change orders to manage product changes in a manufacturing environment based on the documentation changes information. The pros and cons of differing change order processes will be discussed. Sample 2: Students are required to read articles and collect research data from web based professional journals relative to management of the CAD environment. The instructor will then guide students in using the data to develop an active CAD standard. Students will review their peers writings.

Writing, Problem Solving or Performance

College level problem solving and/or writing assignments are regularly utilized. Problem solving and skill demonstrations are crucial to any successful basic drafting course. Sample 1: Students will write papers comparing and contrasting various approaches to the application of local and/or national standards to engineering drawings. Sample 2: Students are to develop a strategy for the implementation of layer structures within their disciplines in a CAD environment.

Other (Term projects, research papers, portfolios, etc.)

Students will develop a standards manual for their discipline as a term project. Students are required to build an engineering model/prototype for their discipline.

Required Materials

- Architect's Guide to the US National CAD Standard
 - Author: Dennis Hall, Charles Green
 - Publisher: Wiley
 - Publication Date: 2015
 - Text Edition: 1st
 - Classic Textbook?: No
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.