

# Des Moines Area Community College

## Course Information – EFFECTIVE Aug. 2006

Acronym/Number CAD 153 Historical Ref CADT 412

Title CAD Applications I

Credit breakout	<u>3</u>	<u>2</u>	<u>2</u>	<u>0</u>	<u>0</u>
	(credit	lecture	lab	practicum	work experience)

**PREREQUISITE(S):** CAD 152, MAT 773

### **COURSE DESCRIPTION:**

Mechanical components and processes that are used in product design will be covered. Geometric dimensioning and tolerancing will be taught. Preparation of welding drawings will be presented with the emphasis on proper usage of American Welding society symbols. Precision bending of sheet metal will be covered.

### **COURSE COMPETENCIES:**

*During this course, the student will be expected to:*

1. Analyze surface finishes.
  - 1.1 Discuss surface finish terminology.
    - 1.1.1 Discuss surface finish symbol.
      - 1.1.1.1 Discuss symbol orientation.
  - 1.2 Relate surface finish to tolerances.
    - 1.2.1 Discuss obligatory machining.
    - 1.2.2 Discuss minimum and maximum finish values.
  - 1.3 Relate surface finishes to production processes.
    - 1.3.1 Discuss casting allowances.
    - 1.3.2 Discuss surface imperfections.
  - 1.4 Examine CAD symbol libraries.
    - 1.4.1 Create a surface finish symbol block.
  - 1.5 Apply surface finishes to a CAD part drawing.
2. Examine geometric tolerancing.
  - 2.1 Define geometric tolerancing.
    - 2.1.1 Determine primary datums.
    - 2.1.2 Determine secondary datums.
    - 2.1.3 Determine tertiary datums.
  - 2.2 Analyze geometric tolerancing theorems.
    - 2.2.1 Discuss dimensional tolerances.
    - 2.2.2 Analyze circular tolerance zones.
  - 2.3 Identify geometric feature control symbols.
    - 2.3.1 Discuss material condition modifiers.
    - 2.3.2 Discuss datum applications.
    - 2.3.3 Discuss multiple feature controls.

- 2.3.4 Create feature control symbol blocks.
- 2.4 Apply geometric tolerancing to a CAD drawing.
- 3. Identify basic thread forms.
  - 3.1 Discuss thread theorems.
  - 3.2 Identify parts of the thread form.
  - 3.3 Calculate thread tolerances/fits.
  - 3.4 Identify SAE/ANSI thread standards.
    - 3.4.1 Discuss standard thread forms.
    - 3.4.2 Discuss non-standard thread forms.
    - 3.4.3 Discuss standard threaded fasteners.
  - 3.5 Identify metric thread standards.
  - 3.6 Discuss CAD construction of threads.
  - 3.7 Create detailed thread drawings.
  - 3.8 Dimension threads.
  - 3.9 Discuss thread applications.
- 4. Identify complex thread forms.
  - 4.1 Identify parts of the thread form.
  - 4.2 Calculate thread tolerances/fits.
  - 4.3 Discuss CAD construction of threads.
  - 4.4 Create detailed thread drawings.
  - 4.5 Dimension threads.
  - 4.6 Discuss thread applications.
    - 4.6.1 Discuss using threads for power transmission.
    - 4.6.2 Discuss hybrid types of mechanisms.
- 5. Analyze datums.
  - 5.1 Identify casting datums.
  - 5.2 Identify machine datums.
    - 5.2.1 Determine primary machine datum.
  - 5.3 Create a datum symbol block.
- 6. Discuss casting drawings.
  - 6.1 Examine draft.
  - 6.2 Discuss fillets and rounds.
    - 6.2.1 Examine drawing representation.
    - 6.2.2 Discuss minimum values.
  - 6.3 Analyze machining allowance.
    - 6.3.1 Discuss casting/machining drawings.
  - 6.4 Discuss shrinkage allowance.
  - 6.5 Discuss forging drawings.
  - 6.6 Create a casting drawing.
- 7. Analyze weldments.
  - 7.1 Examine standard welds.
  - 7.2 Identify the American Standard Weld symbol.
    - 7.2.1 Discuss general notes for weldments.

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- 7.2.1.1 Create general note files in CAD.
    - 7.2.2 Discuss symbol orientation.
    - 7.2.3 Create weld symbol library in CAD.
  - 7.3 Identify correlation of geometric tolerancing and weldments.
    - 7.3.1 Discuss surface finishes of welds.
  - 7.4 Discuss related weld applications.
    - 7.4.1 Discuss plasma welds.
    - 7.4.2 Discuss flame cutting.
      - 7.4.2.1 Create flame cut template in CAD.
  - 7.5 Create a welded assembly.
    - 7.5.1 Apply CAD library symbols.
    - 7.5.2 Apply geometric tolerances.
8. Examine sheet metal.
- 8.1 Discuss bend allowances for sheet metal.
    - 8.1.1 Discuss bend radii.
    - 8.1.2 Discuss standard sheet metal thicknesses.
  - 8.2 Calculate bend allowances.
    - 8.2.1 Calculate allowances.
  - 8.3 Examine flat pattern layouts.
    - 8.3.1 Discuss two dimensional "solid" CAD models.
      - 8.3.1.1 Fold a two dimensional solid model.
      - 8.3.1.2 Shad a two dimensional solid model.
  - 8.4 Create a flat pattern.

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**COMPETENCIES REVIEWED AND APPROVED BY:**

**DATE:** \_\_\_\_\_

**FACULTY:**

- 1.
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- 6.

Effective date: August, 2004

by: J. Leetch

Campus: A B C U N W OC

extension: 6377

Revision(s): 4/95; 7/96