

# Des Moines Area Community College

## Course Information – EFFECTIVE Aug. 2006

Acronym/Number CAD 254 Historical Ref CADT 463

Title Design Project II

Credit breakout 5 2 6 0 0  
(credit lecture lab practicum work experience)

**PREREQUISITE(S):** CAD 153, CAD 215, CAD 252

### **COURSE DESCRIPTION:**

Continuation of CAD 252, Design Project I. Detailing individual parts, types of assembly drawings and parts lists will be covered on an individual basis. Design process and procedures will be discussed. The student shall conform to industry standards for their design project.

### **COURSE COMPETENCIES:**

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

1. Re-examine prototyping.
  - 1.1 Discuss fabricating engineering models.
  - 1.2 Examine rapid prototyping.
  - 1.3 Create a model from one of the parts in the design project.
2. Examine fits and clearances on project.
  - 2.1 Analyze tolerances on parts.
  - 2.2 Revise parts that interfere or fit improperly.
  - 2.3 Examine materials for possible warping, etc.
3. Examine design project materials.
  - 3.1 Discuss materials used in design.
  - 3.2 Examine problems with 'incompatible' materials.
  - 3.3 Discuss fabrication and post-process effects on materials.
4. Discuss catastrophic failure occurring from defective materials.
  - 4.1 Analyze what materials are most subject to failure.
    - 4.1.1 Discuss preventative measures to try to prevent failure.
  - 4.2 Analyze altering or changing materials for cost, safety and/or durability.
  - 4.3 Discuss safety factors.
5. Determine finishes for the design project.
  - 5.1 Discuss corrosion protection.
  - 5.2 Examine standard finishes.
    - 5.2.1 Discuss how materials determine standard finishes.
  - 5.3 Examine plating.
    - 5.3.1 Discuss effects of plating on part sizes.

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- 5.3.2 Discuss wear ability of types of plating.
- 5.4 Discuss non-standard finishes.
  - 5.4.1 Examine plastic coating.
  - 5.4.2 Examine cladding.
- 6. Evaluate manufacturing processes used in the design project.
  - 6.1 List manufacturing processes used in your design project.
    - 6.1.1 Discuss listing all of the processes used on a part in a 'methods' sheet.
    - 6.1.2 Examine how an industrial engineer utilizes methods sheets to improve production.
  - 6.2 List machines required to manufacture the design project.
    - 6.2.1 Discuss how the machines used to create the part could be used on a 'methods' sheet from 6.1.1.
  - 6.3 Discuss how your project could benefit from modern fabrication processes. (Discuss during milestone meetings or CDR.)
  - 6.4 Using one fabricated piece part in the project, write a 'methods' sheet.
    - 6.4.1 Show machines required to produce the part.
- 7. Create project cost analysis.
  - 7.1 Examine approximate cost of fabricated parts.
  - 7.2 Examine cost of purchased parts.
  - 7.3 Discuss steps that could cut cost of project.
  - 7.4 Discuss projected product 'life cycle'.
  - 7.5 Create an approximate cost analysis of your project.
- 8. Examine re-designing parts and assemblies.
  - 8.1 Discuss 'design-to-cost' principles.
    - 8.1.1 Examine cutting costs without sacrificing quality.
  - 8.2 Discuss re-designing because of possible design failure(s).
    - 8.2.1 Evaluate safety factors.
      - 8.2.1.1 Examine the effects of lowering safety factors.
    - 8.2.2 Discuss changing materials (see item 4).
  - 8.3 Examine re-designing because of copyright/patents.
    - 8.3.1 Discuss copyright/patent infringements.
  - 8.4 Discuss re-designing an old or obsolete design.
- 9. Create a project parts drawing package in accordance with industry standards.
  - 9.1 Utilize proper drawing techniques.
  - 9.2 Utilize product lifecycle management to track revisions.
  - 9.3 Maintain project timeline tracking.
    - 9.3.1 Insure project is on track with timeline.
    - 9.3.2 Examine utilizing project management software.
  - 9.4 Create part drawings.
  - 9.5 Plot part drawings.
- 10. Compile a project parts list.
  - 10.1 Discuss extracting attributes from database.

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- 10.2 Discuss using standard parts.
    - 10.2.1 Discuss just-in-time inventory control.
  - 10.3 Compile parts list.
  - 10.4 Examine sub-assemblies with associated parts lists.
  - 10.5 Discuss utilizing a parts list to build a product in a specific sequence.
11. Examine project parts list.
- 11.1 Analyze parts list for cost reduction.
    - 11.1.1 Examine using purchased parts in lieu of fabricating a part.
    - 11.1.2 Examine replacing an expensive material with an inexpensive material.
  - 11.2 Examine consolidating parts lists.
  - 11.3 Cross check drawings and parts lists for errors.
12. Create project assembly drawing(s) package in accordance with industry standards.
- 12.1 Insert parts lists(s).
  - 12.2 Correlate part data to assembly data.
  - 12.3 Examine clarifying assembly data by using sections and auxiliary views.
13. Compile project parts family tree.
- 13.1 Discuss part hierarchy.
  - 13.2 Compile family tree.
14. Prepare a confirmed design review (CDR) for completed project.
- 14.1 Compile final design journal entries.
  - 14.2 Create an appointment with the design reviewers for CDR. (Design reviewers appointed by instructor.)
  - 14.3 Meet with reviewers for completion of the CDR.
  - 14.4 Create notes of the CDR to be turned in with the project.
15. Complete a final design drawing package.
- 15.1 Re-engineer parts that were found to be in need of change during your CDR.
  - 15.2 Re-plot any revised drawings.
16. Finalize the design project started in CADT 461.
- 16.1 Submit design project journal.
  - 16.2 Submit design project report.
  - 16.3 Submit design project drawings.
  - 16.4 Submit design project family tree.

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**COMPETENCIES REVIEWED AND APPROVED BY:**

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

**FACULTY:**

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Effective date: August, 2004

by: JM Leetch

Campus: A B C U N W OC

extension: 6377

Revision(s): \_\_\_\_\_