Des Moines Area Community College

COURSE COMPETENCY INFORMATION

Effective Date: August 2007

Acronym/Number: CAD 182 Historical Reference:

Course Title: SolidWorks CAD I

Credit Breakout: 3 2 2 0 0

(Total Credits:	Lecture	Lab	Practicum	Work Experience)
	1hr/crdt	*2hrs/crdt*	*3hrs/crdt*	*4hrs/crdt (unsupervised)*

PREREQUISITE*:*

CAD 152, CAD 240, MAT 773

COURSE DESCRIPTION*:*

Parametric solid model (3D) CAD basics will be taught using SolidWorks. Parametric concepts will be covered. Solid CAD models will be built and edited in SolidWorks. Assemblies of solid parts will be examined. Part drawings will be created and plotted.

COURSE COMPETENCIES:

During this course, the student will be expected to:

1. Discuss the parametric design process.
   - 1.1 Discuss what solid (3D) modeling is.
   - 1.2 Discuss what parametric design is.

2. Discuss typical parametric CAD system fundamentals.
   - 2.1 Examine the screen layout.
   - 2.2 examine the main menu.
   - 2.3 Examine menu structures.
   - 2.4 Examine coordinate system.
     - 2.4.1 Discuss global space coordinates.
     - 2.4.2 Discuss relative coordinates.
     - 2.4.3 Discuss local coordinate spaces.
   - 2.5 Examine entering commands and options
     - 2.5.1 Discuss command format for this text.
   - 2.6 Examine file management.
     - 2.6.1 Discuss saving files.
     - 2.6.2 Discuss backup and recovery files.
   - 2.7 Examine loading a model.
   - 2.8 Examine on-line documentation.
     - 2.8.1 Discuss model inquiry.

3. Examine the parametric design cycle.
   - 3.1 Discuss design concepts.

3.1.1 Discuss design intent.
3.1.2 Discuss the “design circle”.
3.2 Examine part functionalities.
3.3 Examine assembly functionalities.
3.4 Examine drawing functionalities.

4. Examine model view representation.
4.1 Discuss wire frame representation.
4.2 Discuss surface representation.
4.2.1 Discuss surface types.
4.3 Discuss solid representation.
4.3.1 Discuss part materials.
4.3.2 Discuss part color.
4.4 Examine view manipulation.
4.4.1 Discuss obtaining multiple simultaneous views.

5. Discuss parametric CAD construction fundamentals.
5.1 Discuss construction of parts.
5.1.1 Examine Boolean operations versus parametric operations.
5.2 Discuss construction of assemblies.
5.3 Discuss construction of drawings.
5.4 Examine the model tree.
5.5 Examine modifying objects.
5.6 Discuss object associativity.
5.6.1 Examine drawing/model associativity.
5.7 Discuss parametric feature relations.
5.8 Examine design datums, axis, curves and points.
5.9 Discuss creating geometry.
5.10 Discuss parent/child hierarchy.
5.10.1 Discuss design problems relating to parent/child relationships.
5.11 Discuss feature attributes.
5.12 Discuss blind or through features.
5.13 Discuss single features.
5.14 Discuss linear, radial, coaxial or on point features.

6. Utilize the parametric two-dimensional sketcher to construct geometry.
6.1 Discuss construction feature creation.
6.2 Discuss use of datum planes.
6.2.1 Examine using auxiliary datum planes.
6.3 Examine sketcher drawing tools.
6.4 Examine sketcher constraints.
5.4.1 Discuss parametric relations.
6.5 Examine typical parametric CAD dimensioning.
6.5.1 Examine linear dimensions.
6.5.2 Examine diameter dimensions.
6.5.3 Examine radial dimensions.
6.5.4 Examine angular dimensions.
6.5.5 Examine modifying dimensions.

6.6 Examine sketch regeneration using troubleshooting un-regenerated sections.
6.7 Examine sketcher assumptions.
6.8 Create and modify cross sections.

7. Examine inserting features.
   7.1 Examine the using the hole wizard tool for placement and hole type.
      7.1.1 Use hole wizard tool to examine and edit dimensions.
      7.1.2 Examine depth types.
         7.1.2.1 Examine blind depth.
         7.1.2.2 Examine thru all depth.
         7.1.2.3 Examine up to next depth.
         7.1.2.4 Examine up to vertex depth.
         7.1.2.5 Examine up to surface depth.
         7.1.2.5 Examine offset from surface depth.
         7.1.2.6 Examine up to body depth.
         7.1.2.7 Examine midplane depth.
   7.2 Examine fillets.
   7.3 Examine rounds.

8. Examine modifying features.
   8.1 discuss modifying features of edit definition and re-routing.
   8.2 discuss deleting features.
      8.2.1 Re-examine parent/child relationships.
   8.3 discuss suppressing features.
   8.4 Examine mirroring features.
   8.5 Examine copying features.

9. Discuss pattern features.
   9.1 analyze linear patterns.
   9.2 Analyze radial patterns.

10. Examine editing dimensional sizes.
   10.1 Discuss edits in model space.
   10.2 Examine re-defining a sketch.
   10.3 Examine dimension relations.

11. Discuss part design.
   11.1 Examine part design philosophy.
   11.2 Discuss part set up.
   11.3 Examine base features.
   11.4 Examine dimensioning schemes.
   11.5 Determine features.
   11.6 Add feature relations.
   11.7 Re-examine parent/child relationships.
   11.8 Display datum plane(s).
   11.9 Display mass properties.

12. Examine other special shapes.

12.1 Dsicuss splines.
12.2 Discuss thin solids.
12.2.1 Discuss surfaces.
12.3 Discuss lofts.
12.4 Discuss helix curves.

13. Examine assembly fundamentals.
13.1 Examine assembly design philosophy.
13.2 Set-up an assembly with assembly parts.
13.3 Apply assembly constraints.
13.4 Perform assembly modifications and re-design parts if required.
13.5 Create assembly design using sub-assemblies.
13.6 Examine exploded assemblies.

14. Describe drawing fundamentals.
14.1 Create a drawing using dimension styles.
14.2 Create drawing views with manipulated views examining additional centerlines.
14.3 Examine adding dimension while displaying tolerances.
14.4 Manipulate dimensions.
14.4.1 Clean up dimensions.
14.5 Create notes and drawing text.
14.6 Examine sections and cutting plane(s).
14.7 discuss layer(s) using layers in drawings.

15. Examine plotting.
15.1 Discuss plotting to a file.
15.2 Plot a drawing.

CAD 182

LIST Discipline Faculty members that have reviewed the competencies:

FACULTY:
1. John Leetch
2. Drew Gocken
3.
4.
5.
6.

Competencies Developed/Modified By: John Leetch

Date: **October 2006**

By:

Extension: **6377**

Campus: **A** **B** **C** **N** **U** **W**