MET-2041: CAD II & GD&T

Cuyahoga Community College

Viewing: MET-2041 : CAD II & GD&T

Board of Trustees:

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Academic Term:

Fall 2020

Subject Code

MET - Mech Eng/Manuf Ind Eng Tech

Course Number:

2041

Title:

CAD II & GD&T

Catalog Description:

Advanced engineering drawing concepts used with computer-aided drafting software. Drawing applications include size tolerancing, geometric dimensioning, thread and fastener specifications, detail and assembly drawings, weldments, external references, bill of materials and standardized drawing formats. Introduction to solid modeling.

Credit Hour(s):

3

Lecture Hour(s):

2

Lab Hour(s):

3

Requisites

Prerequisite and Corequisite

MET-1230 Drawing & AutoCAD, and MET-1120 Computer Applications and Programming, or departmental approval.

Outcomes

Course Outcome(s):

Create template drawing files and profiles to be used as standard drawing set-up

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Apply blocks and attributes to create the title block.
2. Set up dimensioning styles.
3. Apply attributes to an Assembly drawing
4. Extract a bill of material from the attributes
5. Put together an assembly drawing using external references
6. Change setting variables to customize the drawing for personal use.
7. Save and retrieve a template drawing.
8. Create, save and use a profile.

Course Outcome(s):

Apply proper size tolerancing to drawings.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Apply size tolerancing to mated parts.
2. Look up and apply size tolerances from technical charts.
3. Define the basic terms used with geometric dimensions and tolerancing.
4. Define size tolerancing terms.

Course Outcome(s):

Apply geometric dimensioning and tolerancing techniques in engineering design, production and drawing interpretation.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Define the basic terms used with geometric dimensions and tolerancing.
2. Define and apply form tolerances: flatness, straightness, circularity, and cylindricity.
3. Define and apply datums: primary, secondary, and tertiary.
4. Define and apply orientation tolerances: parallelism, perpendicularity, and angularity.
5. Define and apply position tolerances for fixed and floating fastener conditions.
6. Define and apply Runout and profile tolerances: total runout, circular runout, line profile, surface profile.

Course Outcome(s):

Apply geometric dimensioning and tolerancing techniques when mating engineering parts.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Course Outcome(s):

Identify, draft and apply thread specifications to a drawing

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Define thread terminology.
2. Identify various thread forms
3. Detail a proper thread note on a drawing
4. Reference specialized charts for thread and drill information
5. Identify the uses of various fastening devices
6. Draw and properly detail fasteners.

Course Outcome(s):

Recognize the application of a variety of fastening devices.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Course Outcome(s):

Extract a bill of material from an assembly drawing.

Essential Learning Outcome Mapping:

Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Create and define attributes and blocks
2. Apply attributes to an Assembly drawing
3. Extract a bill of material from the attributes

Course Outcome(s):

I. Create an assembly drawing as an external reference file.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Modify external references.

Course Outcome(s):

Interpret notes on engineering drawings.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Interpret local notes.
2. Interpret general notes.
3. Identify surface texture principles and symbols.

Course Outcome(s):

Interpret the process for changes on engineering drawings.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Identify surface texture principles and symbols.
2. Measure surface finishes on machine parts.
3. Reading examples of engineering change orders.
4. Reading the noted items in a revision block.

Course Outcome(s):

Interpret specialized drawings used for manufacturing processes.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Recognizing welding symbols and reference dimensions for drawings and its relationship to structural drawings showing metal joining details.
2. Recognizing sheet metal intersections and development drawings showing the shape and size of geometric shapes.
3. Recognize symbols and schematics of electronic diagrams.

4. Apply basic gear tooth calculations to spur gears.

Course Outcome(s):

Develop a positive attitude for using the computer as a drawing tool.

Objective(s):

1. Describe the advantages of using computer software as a drafting tool.
2. Use computer techniques to create drawings more efficiently.
3. Develop a level of comfort in using computer software as a drafting tool.

Course Outcome(s):

Understand and apply the concepts of 3D Solid Modeling.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

1. Describe the characteristics of 3D solid modeling.
2. Differentiate between 2D and 3D concepts.
3. Create 3D solid models using a CAD program.

Course Outcome(s):

Produce complex 2D drawings.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Written Communication: Demonstrate effective written communication for an intended audience that follows genre/disciplinary conventions that reflect clarity, organization, and editing skills.

Objective(s):

1. Create a detail drawing using the proper standards and conventions.
2. Create an assembly drawing using the proper standards and conventions.
3. Dimension a drawing using the proper standards and conventions.

Methods of Evaluation:

A. Lab assignments
B. Lab projects
C. Midterm exam or quizzes
D. Final exam

Course Content Outline:

1. Concepts
   a. Size tolerances and Geometric Dimensions and Tolerances
   b. Thread specifications
   c. Dimension variables
   d. Profiles
   e. Template drawings
   f. 2D Detail drawing standards
   g. 2D Assembly Drawing standards
   h. Fastening devices
   i. Bill of Material Creation and Extraction
   j. Using external reference files
   k. Interpret specialized drawings used in manufacturing.
   l. 3D solid modeling
2. Skills

a. Using the computer efficiently
b. Using and customizing software applications
c. Design and modify parts and systems using a design process
d. Applying and identifying the proper tolerances for a drawing
e. Creating 2 D detail and assembly drawings
f. Utilizing threads on drawings with the proper standards.
g. Create a proper weldment drawing
h. Working in a team environment
i. Communication of ideas orally and verbally
3. Issues
a. Working with diverse individuals and teams
b. Developing a level of comfort with the computer and software to embrace software and hardware changes and upgrades.
c. Developing a positive attitude about using tools of the Engineering field.

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Resources

Puerta, Frank Autodesk, Inc. *AutoCAD 2011 in 3D: A Modern Perspective.* 1st ed. Upper Saddle River, NJ: Prentice Hall, 2011.

Ethier, Stephen J, and Christine A. Ethier. *Instant Design: Fundamentals of Autodesk Inventor 2010.* Upper Saddle River, NJ: Prentice Hall, 2009.

Madsen, David. *Geometric Dimensioning and Tolerancing.* 7th ED. Tinley Park, IL: Goodheart-Wilcox, 2003.

Giesecke, Frederick et al. *Technical Drawing.* 14th Ed. Upper Saddle River, NJ., 2012.

Jenson, Cecil and Jay Helsel. *Interpreting Engineering Drawings.* 7th Ed. Clifton Park, NY, 2007.

Dix, Mark and Paul Riley. *Discovering AutoCAD 2013.* 1st ED. Upper Saddle River, NJ.:Prentice Hall, 2013.

Instructional Services

OAN Number:

Transfer Assurance Guide OET012 and Career Technical Assurance Guide CTMET005

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