DRAF G110: ENGINEERING DRAFTING II, COMPUTER AIDED DRAFTING

Item	Value
Curriculum Committee Approval Date	10/18/2022
Top Code	095300 - Drafting Technology
Units	3 Total Units
Hours	90 Total Hours (Lecture Hours 36; Lab Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

Formerly: Basic Engineering Drafting II, Computer Aided Drafting. This course is 3D solid modeling design for mechanical drafters, designers, and engineers. Students will use current 3D software and computer lab projects to develop solid models, assemblies, and drawings. ADVISORY: DRAF G105. Transfer Credit: CSU; UC.

Course Level Student Learning Outcome(s)

1. Course Outcomes
2. Apply principles of 2D technical drawings to create 3D models.
3. Design solid models, assemblies, and detail drawings using a feature-based parametric design software.
4. Apply geometric dimensioning and tolerancing (GDT).

Course Objectives

- 1. Develop and improve computer literacy including 3D CAD software.
- 2. Design a 3D part model with the correct dimensional and geometric sizes and constraints.
- 3. Apply industry and military drawing standards.
- 4. Develop technical drawings using 3D computer software.

Lecture Content

Introduction to Three-Dimensional Modeling Rendering Models Construction Techniques Guidelines for 3D Drawings Creating Primitives and Composites Solid Modeling Planar Surfaces Creating Composite Solids Three-Dimensional Coordinates and Systems Spherical Coordinates Cylindrical Coordinates Model Extrusions and Revolutions Creating Extruded Models Creating Revolved Models Sweeps and Lofts Swept Surfaces and Solids Lofts Mesh Modeling Advanced Surface Modeling Understanding Surface Model Types Creating Surfaces from Existing Surfaces Methods of Modeling Solid Model Editing Face Editing Edge Editing Extracting and Wireframe Body Editing Text and Dimensions Dimensions in 3D Basic Rendering Material Selection Motion and Views of a 3D object Cameras and Flybys CAD in Manufacturing Sand Casting 3D Printing Fillets and Rounds Runouts Forging Die Casting Stock Forms Welding Lathe Finished Holes Shaper Milling Grinding Heat-Treating Automation Plastics

Lab Content

Introduction to 3D Design in CAD Feature Based Modeling Sketched Features Placed Features Reference Geometry Parametric Modeling Assembly Modeling Modeling Motion User Interface of 3D CAD Menu Bar View/Navigation Tools Command Manager Feature Manager Pulldown Menus File Management Sketching Relations, and the Base Feature Creating a Part Skecthing Relations Dimensions Relationship to Origin Extruding the Part Editing the Feature and Sketch Trimming Circles and Arcs and Relations Advanced Sketching, Equations and Construction Geometry Equations in Sketch Dimensions Construction Geometry Sketch Mirror Entities Tool Revolved Boss/Base Tool Secondary Sketches and Reference Geometry Creating Secondary Sketches and Adding Features End Condition Extrusion Options Start Condition Extrusion Options Converting Geometry and Projecting it to a Sketch Plane Default Planes and Mid Plane Construction Adding Features Hole Tool Threaded Holes Pipe Thread Holes Clearance Holes Counter-bore and Countersunk Holes Cosmetic Thread Tool Fillets and Rounds Chamfers Linear and Circular Patterns Mirror Tools Adding Features Continued (advanced) Shell Rib Text Tools Drafts Spit Tools Creating Part Drawings 2D Part Drawings Drawing Views Full Section View Half Section View Auxiliary Views Broken-Out Section Views Dimensioning and Annotating Drawings Drafting Standards Centerlines Sweeps and Lofts Creating Sweep Features Creating a Loft Building an Assembly Drawing with Mates Creating an Assembly Building an Assembly Constraining Edges Tangent Mate Working with Assemblies Creating the New Part Adaptive Parts Mechanical Assembly Mates Gear Mate Rack and Pinion Mate Cam Mate Surfaces Extruded Surfaces Revolved Surfaces Lofted Surfaces Swept Surfaces Thickening and Offsetting Surfaces Surfaces as Construction Geometry Assembly Drawings Creating Views Creating Annotations Exploded Views and Animations Create an Exploded View Animate a View Editing an Animation

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)
- DE Live Online Lab (04S)
- DE Online Lab (04X)

Instructional Techniques

The primary mode of instruction is lecture/demonstration with Gradual Release of Responsibility (GRR).

Reading Assignments

Textbook Required Reading Websites Instructing CAD Techniques

Writing Assignments

Estimate a proposed design from the point of view of assembly and manufacturing Predict how parametric design is likely to impact the role of designers in a brief narrative.

Out-of-class Assignments

Explore Library Media Center or MakerSpace Equivalent. Library Research

Demonstration of Critical Thinking

Evaluate finished designs to create 3D presentations and technical documents. Analyze relationships between design elements for parametric modeling. Create proper dimensioning standards for specific technical documents.

Required Writing, Problem Solving, Skills Demonstration

Design a 3D solid model and assembly of mechanical design. Combine principles of math, science and other related fields into the use of CAD software. Apply principles of parametric modeling. Apply dimension drafting standards to technical documents.

Eligible Disciplines

Drafting CADD (computer -aided drafting/ design), CAD (computer- aided desi...: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Giesecke, Goodman, Mitchell, Spencer, Hill, Dygdon, Novak, Loving, Lockhart Johnson. Technical Drawing with Engineering Graphics, 15th ed. Prentice Hall, 2017 Rationale: -