Subject:	CADD
Course Number:	22
Descriptive Title:	Introduction to 3D Design with SolidWorks
Division:	Industry and Technology
Department:	Computer Aided Design/Drafting
Course Disciplines:	Computer Aided Design/Drafting, Drafting
Catalog Description:	This introductory course in three-dimensional (3D) modeling and drafting utilizes SolidWorks, an industry-level engineering and product design software. It caters to individuals new to 3D design or those without prior Computer Aided Design (CAD) experience. The curriculum guides students in creating 3D models from mechanical drawings and developing industry-standard CAD drawings for manufacturing. Covered topics encompass design intent and process, sketching techniques, model and drawing modifications, orthographic two-dimensional (2D) drawings with dimensions, and basic assembly techniques. This course, the first installment in a three-part series, readies students for the Certified SolidWorks Associate (CSWA) and/or Certified SolidWorks Professional (CSWP) exams.
Prerequisite:	
Co-requisite:	
Recommended Preparation:	
Enrollment Limitation:	
Hours Lecture (per week):	2
Hours Laboratory (per week):	4
Outside Study Hours:	4
Total Course Hours:	108
Course Units:	3
Grading Method:	Letter Grade only
Credit Status:	Credit, degree applicable
Transfer CSU:	Yes
Effective Date:	
Transfer UC:	Yes
Effective Date:	propose/pending
General Education ECC:	
Term:	
Other:	
CSU GE:	
Term:	
Other:	

IGETC:	
Term:	
Other:	

Student Learning Outcomes:	**SLO #1 Creating Dimensioned Multi-View Drawings** Students will be able to use the SolidWorks software to produce dimensioned orthographic drawings of basic machined parts based on the provided information and dimensions. **SLO #2 Modifying a Solid Model** Students will be proficient in using the SolidWorks software to adjust and alter the provided basic part and dimensioned drawing of a 3D solid model to meet the required specifications. **SLO #3 Creating Assembly Models** Students will be able to use the SolidWorks software to create and assemble 3D solid model parts for comprehensive assemblies.
Course Objectives:	1. Create and manipulate basic 3D models with SolidWorks. 2. Apply functional dimensions to 3D models with SolidWorks. 3. Analyze and assign tolerances to dimensioned model features. 4. Develop and set up relative motion between components in an assembly. 5. Create presentation views of assemblies with SolidWorks. 6. Create 2D fully dimensioned orthographic mechanical drawings.

Major Topics:	**I. SolidWorks Basic Functions (5 hours, lecture)**
	
	    A. SolidWorks interface
	    B. User coordinate system, the X, Y, Z axis, and planes
	    C. Parametric modeling
	
	II. SolidWorks Sketching (10 hours, lab)
	
	    A. Sketching on planes vs surfaces
	    B. SolidWorks basic sketching commands
	
	III. Sketching Concepts & Best Practices (5 hours, lecture)
	
	    A. Drawing and editing tools
	    B. Drawing units, dimensions, and annotations
	    C. Manipulating wireframe geometry in 3D space
	
	IV. Sketching Concepts (10 hours, lab)
	
	    A. Moving and rotating sketches
	    B. Creating planes and using line types
	    C. Applying dimensions and or geometric constraints

V. Constraints and Relationships (5 hours, lecture)

    A. Fully constrained geometry
    B. Modifying existing relationships
    C. Over-constrained and driven dimensions

VI. Applying Constraints to Sketches (10 hours, lab)

    A. Modifying existing relationships
    B. Over-constrained and driven constraints
    C. Parametric equations

VII. Solid Modeling (5 hours, lecture)

    A. Constructive solid geometry concepts
    B. Additive operations, 2D sketches and extruding
    C. Object properties and mass properties

VIII. Modeling Practice (10 hours, lab)

    A. Applying extrude option commands
    B. Applying basic or advanced modeling commands
    C. Correcting/modifying sketches or models:
       edit sketch/edit model commands

IX. 2D Drawing Fundamentals (5 hours, lecture)

    A. Format types
    B. Detail drawings views
    C. Bill of Material (BOM)
    D. Annotations
    E. Dimensions
    F. Drawing requirements

X. 3D Drawing (10 hours, lab)

    A. Orthographic, isometric, section, and
       auxiliary views on 2D drawing format
    B. Dimensions, annotations, balloon call
       out for 2D drawing model
    C. Inserting revision block and BOM
    D. Inserting information in title block

XI. Assembly (5 hours, lecture)

    A. Arrangement and constraint of models
       to create 3D assembly
    B. Types and use of assembly constraints

XII. Creation of Assemblies (10 hours, lab)

A. Arranging and constraining models to create a 3D assembly
B. Applying appropriate assembly constraints

XIII. Assembly 2D Drawings (6 hours, lecture)

A. Creating assembly drawing with detail sheets
B. Creating orthographic, section, auxiliary and detail views for assembly 2D drawings
C. Adding annotations, notes, and detail balloons

XIV. Creation of 2D Assembly Drawings (12 hours, lab)

A. Creating orthographic, isometric, section, and auxiliary views
B. Inserting exploded view with balloons and annotations
C. Inserting completed assembly BOM
D. Applying annotations to note all section, auxiliary, and detail views

Total Lecture Hours:	36
Total Laboratory Hours:	72
Total Hours:	108
Primary Method of Evaluation:	3) Skills demonstration
Typical Assignment Using Primary Method of Evaluation:	Assemble the provided Flange Assembly components with precision, ensuring they fit and function correctly. Then, produce a comprehensive 2D assembly drawing featuring orthographic, section, auxiliary, detail, and exploded views. Your drawing must include clear annotations, such as part-identifying balloons, a detailed BOM, and a revision block for documenting changes. Your submission will be assessed for the accuracy of assembly, clarity of visual presentation, and completeness of the provided annotations. Upload files to the cloud or save them to a secure device. Submit the files to the instructor for evaluation.
Critical Thinking Assignment 1:	Apply reverse engineering techniques using SolidWorks to recreate a 3D model from an existing one, ensuring the final model is fully constrained and reflects the original design accurately. Accompanying your model, submit a critical analysis detailing the process, challenges encountered, and the strategies you implemented to overcome them. Upload the model and all associated components to the cloud or save them to a secure device. Submit the files to the instructor for evaluation.
Critical Thinking Assignment 2:	Create a detailed 2D assembly drawing of a Flange Assembly, including multiple view types and annotations such as balloons, BOM, and a revision block, with an evaluation of the assembly process and drawing efficacy. Upload the files to the cloud or save them to a secure device. Submit the files to the instructor for evaluation.
Other Evaluation Methods:	Class Performance, Homework Problems, Objective Exam, Other Exams, Presentation, Quizzes
If Other:	
Instructional Methods:	Demonstration, Discussion, Group Activities, Lab, Lecture
If other:	

Work Outside of Class:	Problem solving activity, Required reading, Skill practice, Study
If Other:	
Up-To-Date Representative Texts:	Paul Tran. SOLIDWORKS 2022 Basic Tools. SDC. 2022
Alternative Texts:	
Required Supplementary Readings:	
Other Required Materials:	
Requisite	
Category	
Requisite course:	
Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).	
Requisite Skill:	
Requisite Skill and Matching skill(s): Bold the requisite skill(s). if applicable	
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Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). if applicable	
Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Vince Phamdo
Date:	10/04/2023
Original Board Approval Date:	03/21/2024

Effective Term:	FALL 2024