Subject:	CADD
Course Number:	14
Descriptive Title:	Introduction to 3D Design with CATIA
Division:	Industry and Technology
Department:	Computer Aided Design/Drafting
Course Disciplines:	Computer Aided Design/Drafting, Drafting
Catalog Description:	This foundational course welcomes students to the realm of CATIA, an advanced engineering CAD (Computer-Aided Design) program. This course offers a thorough orientation and overview of the CATIA Three-Dimensional (3D) modeling ecosystem, with a spotlight on crafting three-dimensional geometries, solid modeling from wireframe profiles, sketch planes, elementary assemblies, and drafting methodologies. Students also acquire an in-depth comprehension of the part design, generative shape, and drafting modules within the CATIA software. This is the first course of the two-part CATIA series certificate
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:	pending/propose
General Education ECC:	
Term:	
Other:	
CSU GE:	
Term:	
Other:	
IGETC:	
Term:	

Other:	
Student Learning Outcomes:	**SLO #1 Creating CATIA Engineering Drawings** Given a 3D solid model of a complex machined part, the student will be able to utilize the appropriate functions within the CATIA software to create a fully dimensioned multi-view engineering drawing of the part. **SLO #2 Creating CATIA Simple 3D Solid Models** Given a fully dimensioned multi-view engineering drawing of a machined part, the student will be able to utilize the appropriate functions within the CATIA software to construct a 3D solid model of the part. **SLO #3 Creating CATIA Assembly Models** Given a set of 3D solid models of the component parts of a complex assembly, the student will be able to utilize the appropriate functions within the CATIA software to create a fully constrained assembly model.
Course Objectives:	1. Utilize CATIA software to create and manipulate 3D CAD models of geometrically simple objects. 2. Utilize each of the CATIA menu functions to create 3D solid models based on sketches. 3. Move, rotate, and scale 3D geometry using appropriate menu items and mouse input. 4. Employ the constraint tools to define and control sketched geometry. 5. Plan and execute the interactions of part bodies through the use of Boolean operations. 6. Create and manipulate complex shapes utilizing the part design and generative shape module within the CATIA software. 7. Construct 3D parametric solid models, assemblies, and drawings.
Major Topics:	**I. CATIA Overview Assemblies (6 hours, lecture)** A. System interface B. Menu structure C. Parametric design D. Efficient sketching E. Efficient modeling **II. Basic Geometry Creation/Modification Assemblies (12 hours, lab)** A. Point function B. Line function C. Curve function D. Creating and managing constraints **III. Construion Elements Assemblies (6 hours, lecture)** A. Creating construction elements B. Changing standard to construction elements

C. Hiding construction geometry

IV. Solid Geometry Assemblies (12 hours, lab)

A. Sketcher function
B. Mirror, move, scale, and rotate functions
C. Sketch-based features toolbar
    1. Pad tool
    2. Pocket tool
    3. Shaft tool

V. Drafting Concepts Assemblies (6 hours, lecture)

A. Extracting drawing views from model
B. Dependent views
C. Independent views
D. Dimensioning
E. Drawing and view properties

VI. Drafting Practices Assemblies (12 hours, lab)

A. Creating detailed drawings
B. Assembly drawings
C. Bill of Materials (BOM)
D. Generative drafting

VII. Product Modeling Assemblies (6 hours, lecture)

A. Sketcher
B. Part design
C. Creation of complex shapes
D. Modifying shapes

VIII. Product Modeling Practice Assemblies (12 hours, lab)

A. Managing product structure
B. Assembly elements within the product
C. Part elements within the assembly

IX. Assembly Models Assemblies (6 hours, lecture)

A. Adding parts to assemblies
B. Creating parts within assemblies
C. Managing parts within assemblies

X. Assembly Practice Assemblies (12 hours, lab)

A. Sub-Assemblies
B. Catalog parts
C. Infrastructure options
D. Repeating components placement

	XI. Advanced Assemblies Assemblies (6 hours, lecture) A. Catalogs B. Save Management C. Model Based Definition (MBD) **XII. Advanced Assembly and Drafting Assemblies (12 hours, lab)** A. Creating complex assembly drawings with accurate dimensions B. Creating orthographic, section, auxiliary, and detail views from assembly models
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:	Using a dimensioned drawing of a machine tool holder as a reference, design and produce the sketches that specify its geometric attributes. Employ these sketches to craft a 3D solid model of the tool holder, and integrate the essential features, such as fillets, to comprehensively define the tool holder's geometry. Upload the assembly and all associated components to the cloud or save them to a secure device. Submit the file(s) to the instructor for evaluation.
Critical Thinking Assignment 1:	Using a dimensioned drawing of an arbor press assembled from machined parts, design and generate the essential sketches for creating solid models of each individual part. Follow the required sequence and methodology for using these sketches to define the solid models. Subsequently, employ these solid models to construct the assembly model of the arbor press. Upload the assembly and all associated components to the cloud or save them to a secure device. Submit the file(s) to the instructor for evaluation
Critical Thinking Assignment 2:	In the exhaust flange assembly assignment, analyze geometric elements and label them either under constrained, fully constrained, or over constrained respectively. Rotate the model to best represent the constrained elements and create a screen-plot of the image with the labels shown. Upload the file to the cloud or save it to a secure device. Submit the file 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:	Ascent Center for Technical Knowledge. CATIA V5-6R2018 Introduction to Modeling Learning Guide. 1st Edition (2018). Ascent Technical Knowledge. (Discipline Standard)
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).	
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Enrollment Limitations and Category:	
Enrollment Limitations Impact:	
Course Created by:	Vince Phamdo
Date:	11/04/2023
Original Board Approval Date:	03/21/2024
Effective Term:	Fall 2024