Course Acronym:	CADD
Course Number:	5
Descriptive Title:	Introduction to Mechanical Drafting
Division:	Industry and Technology
Department:	Computer Aided Design/Drafting
Course Disciplines:	Drafting
Catalog Description:	This introduction to mechanical drafting covers the basics of creating technical drawings using traditional manual drafting instruments and sketching and Computer Aided Design/Drafting (CADD) using AutoCAD software. Topics include: lettering, sketching multiview drawings, geometric construction, computer and orthographic CADD, Two Dimensional (2D) and basic Three Dimensional (3D) computer drawings, threads and fasteners and working and assembly drawings using CADD software.
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:	Prior to July 1992
Transfer UC:	Yes
Effective Date:	Fall 2017
General Education: ECC Term:	
Other:	
CSU GE: Term:	
Other:	

IGETC:	
Term:	
Other:	
Student Learning Outcomes:	**SLO #1 Creating Dimensioned Orthographic Drawings** Given sufficient product definition information of a simple machined part, the student will be able to utilize the AutoCad software to produce a dimensioned orthographic drawing of the item. **SLO #2 Creating Missing Orthographic Views** Given an incomplete engineering drawing of a simple machined part, the student will be able to utilize the AutoCAD software to produce the missing views in standard 3rd angle orthographic projection. **SLO #3 Working From Isometric Views** Given an isometric drawing of a simple machined part, the student will be able to utilize the AutoCAD software to produce front, top and right side views in standard 3rd angle orthographic projection.
Course Objectives:	1. Utilize AutoCAD software to produce 2D mechanical drawings. 2. Utilize AutoCAD software to create 2D drawings using geometrical construction. 3. Prepare drawings using orthographic projection both manually sketched and completed with AutoCAD software. 4. Sketch isometric drawings. 5. Create basic 3D drawings with AutoCAD software. 6. Utilize correct dimensioning practices on orthographic projection drawings. 7. Prepare section drawings using AutoCAD software. 8. Interpret thread notes and symbols. 9. Create thread and fastener drawings using AutoCAD software. 10. Create assembly and working drawings using AutoCAD software.

Major Topics:	**I. OVERVIEW OF MECHANICAL DRAFTING (2 hours, lecture)**
	
	    A. Creating orthographic projects by hand sketching
	    B. Creating orthographic projects using AutoCAD software
	    C. Supplies needed
	
	II. COMPUTER BASICS (1 hour, lab)
	
	    A. Computer lab
	    B. AutoCAD demonstration
	
	III. 2D LETTERING/SKETCHING (1 hour, lecture)
	
	    A. Horizontal and vertical lines
	    B. Circles, arcs, ellipses
	    C. Splines, polygons
	
	IV. 2D LETTERING/SKETCHING (2 hours, lab)
	
	    A. Horizontal and vertical lines
	    B. Circles, arcs, ellipses
	    C. Splines, polygons
	
	V. 2D ALPHABET OF LINES USED IN DRAFTING (0.5 hours, lecture)
	
	    A. Line types used in drafting
	    B. Line widths used in drafting
	
	VI. 2D ALPHABET OF LINES USED IN DRAFTING (0.5 hours, lab)
	
	    A. Line types used in drafting
	    B. Line widths used in drafting
	
	VII. 2D CADD INCH AND METRIC TITLE BLOCKS (1 hours, lecture)
	
	    A. Size A and B inch title blocks
	    B. Size A and B metric title blocks
	
	VIII. 2D CADD INCH AND METRIC TITLE BLOCKS (2 hours, lab)
	
	    A. Size A and B inch title blocks
	    B. Size A and B metric title blocks
	
	IX. 2D MULTIVIEW SKETCHING (2 hours, lecture)
	
	    A. Three-view drawing
	    B. Two-view drawing
	    C. Inclined surfaces
	    D. Oblique surfaces
	    E. Cylindrical surfaces
	    F. Fillets and rounds

X. 2D MULTIVIEW SKETCHING (4 hours, lab)

A. Three-view drawing
B. Two-view drawing
C. Inclined surfaces
D. Oblique surfaces
E. Cylindrical surfaces
F. Fillets and rounds

XI. 2D CADD ONE-VIEW DRAWINGS (5 hours, lecture)

A. AutoCAD's user interface
B. The drawing area
C. Assessing AutoCAD commands
D. Standard and quick access tools
E. Coordinates
F. World Coordinate System (WCS)/User Coordinate System (UCS)
G. Draw commands
H. Text
I. Modify
J. Object snap concepts
K. Polar tracking
L. Object snap tracking
M. Dynamic input
N. Grips

XII. 2D CADD ONE-VIEW DRAWINGS (7 hours, lab)

A. AutoCAD's user interface
B. The drawing area
C. Assessing AutoCAD commands
D. Standard and quick access tools
E. Coordinates
F. WCS / UCS
G. Draw commands
H. Text
I. Modify
J. Object snap concepts
K. Polar tracking
L. Object snap tracking
M. Dynamic input
N. Grips

XIII. 2D ORTHOGRAPHIC PROJECTION - SKETCHING (2 hours, lecture)

A. Three-view drawing
B. Two-view drawing
C. Inclined surfaces
D. Oblique surfaces
E. Cylindrical surfaces
F. Fillets and rounds

XIV. 2D ORTHOGRAPHIC PROJECTION - SKETCHING (5 hours, lab)

A. Three-view drawing
B. Two-view drawing
C. Inclined surfaces
D. Oblique surfaces
E. Cylindrical surfaces
F. Fillets and rounds

XV. 2D ORTHOGRAPHIC PROJECTION - CADD (6 hours, lecture)

A. Creating layers
B. Lien type scale
C. Properties
D. Printing CADD drawings
E. Model space

XVI. 2D ORTHOGRAPHIC PROJECTION - CADD (7 hours, lab)

A. Creating layers
B. Lien type scale
C. Properties
D. Printing CADD drawings
E. Model space

XVII. 2D DIMENSIONING ORTHOGRAPHIC PROJECTION DRAWINGS (1 hour, lecture)

A. Detailed drawings
B. Dimensioning rules
C. Dimension appearance and techniques
D. Dimensioning and locating features

XVIII. 2D DIMENSNIONING ORTHOGRPAHIC PROJECTION DRAWINGS (3 hours, lab)

A. Detailed drawings
B. Dimensioning rules
C. Dimension appearance and techniques
D. Dimensioning and locating features

XIX. 2D DIMENSIONING USING CADD SOFTWARE (1.5 hours, lecture)

A. Dimensioning commands
B. Dimension styles
C. Annotating objects

XX. 2D DIMENSIONING USING CADD SOFTWARE (5.5 hours, lab)

A. Dimensioning commands
B. Dimension styles
C. Annotating objects

XXI. 2D SECTION DRAWING - SKETCHING (1 hour, lecture)

A. Types of sectional views
B. Cutting plane lines
C. Basic sections
D. Advanced sections

XXII. 2D SECTION DRAWING - SKETCHING (3 hours, lab)

A. Types of sectional views
B. Cutting plane lines
C. Basic sections
D. Advanced sections

XXIII. 2D SECTION DRAWING USING CADD SOFTWARE (3 hours, lecture)

A. Cutting plane lines in AutoCAD
B. Hatching
C. Half-sections

XXIV. 2D SECTION DRAWING USING CADD SOFTWARE (5 hours, lab)

A. Cutting plane lines in AutoCAD
B. Hatching
C. Half-sections

XXV. 2D PRIMARY AUXILIARY VIEWS - SKETCHING (1 hour, lecture)

A. Reference planes
B. Classifications of auxiliary views
C. Plotting curves

XXVI. 2D PRIMARY AUXILIARY VIEWS - SKETCHING (3 hours, lab)

A. Reference planes
B. Classifications of auxiliary views
C. Plotting curves

XXVII. 2D PRIMARY AUXILIARY VIEWS USING CADD SOFTWARE (2 hours, lecture)

A. Using snap and rotate commands
B. Rotating the UCS in AutoCAD

XXVIII. 2D PRIMARY AUXILIARY VIEWS USING CADD SOFTWARE (2 hours, lab)

A. Using snap and rotate commands
B. Rotating the UCS in AutoCAD

XXIX. 3D PICTORIAL DRAWINGS - SKETCHING (1 hour, lecture)

A. Isometric projection
B. Oblique projection

C. Perspective projection

XXX. 3D PICTORIAL DRAWINGS - SKETCHING (3 hours, lab)

    A. Isometric projection
    B. Oblique projection
    C. Perspective projection

XXXI. 3D BASIC DRAWINGS USING CADD SOFTWARE (2 hours, lecture)

    A. UCS commands in AutoCAD
    B. View commands in AutoCAD
    C. Advanced toolbar to use in 3D drawings
    D. Solid view and Solid draw commands
    E. Printing a 3D drawing

XXXII. 3D BASIC DRAWING USING CADD SOFTWARE (3 hours, lab)

    A. UCS commands in AutoCAD
    B. View commands in AutoCAD
    C. Advanced toolbar to use in 3D drawings
    D. Solid view and Solid draw commands
    E. Printing a 3D drawing

XXXIII. THREADS AND FASTENERS (2 hours, lecture)

    A. Manual drafting
        1. Fasteners
        2. Screw thread definitions
        3. Types of thread
    B. Using CADD software
        1. Unified threads
        2. Metric threads
        3. External and internal threads
        4. Fasteners

XXXIV. DETAIL AND ASSEMBLY DRAWING USING CADD SOFTWARE - FINAL PROJECT (2 hours, lecture)

    A. Size B title blocks
    B. Parts list
    C. Detail orthographic drawings and dimensions
    D. Exploded assembly drawings

XXXV. THREADS AND FASTENERS (6 hours, lab)

    A. Manual drafting
        1. Fasteners
        2. Screw thread definitions
        3. Types of thread
    B. Using CADD software
        1. Unified threads

2. Metric threads
3. External and internal threads
4. Fasteners

XXXVI. DETAIL AND ASSEMBLY DRAWING USING CADD SOFTWARE - FINAL PROJECT (10 hours, lab)

A. Size B title blocks
B. Parts list
C. Detail orthographic drawings and dimensions
D. Exploded assembly drawings

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:	On AutoCAD software, produce a complete orthographic projection drawing of a tool block from the dimensioned isometric sketch provided. Print and submit drawing to the instructor.
Critical Thinking Assignment 1:	Provided with pictorial views and two orthographic views of ten 3D objects, sketch the missing view for each model in the space provided. Share your solutions with the class and submit pictoral views to the instructor.
Critical Thinking Assignment 2:	On AutoCAD software, draw the necessary primary and auxiliary views to completely represent the Angular Bearing Support (Part #20166) provided. Apply details, dimensions and the notes necessary for the part to be manufactured. Print and submit drawing to the instructor.
Other Evaluation Methods:	Performance Exams Other Exams Quizzes Class Performance Homework Problems Multiple Choice Completion Matching Items True/False
Instructional Methods:	Demonstration Laboratory Lecture Multimedia Presentations
If other:	
Work Outside of Class:	Study Required reading Problem solving activities
If Other:	

Up-To-Date Representative Textbooks:	James Leach and Shawna Lockhart, <u>AutoCAD 2022 Instructor</u> with Access, SDC Publications, 2021 Randy Shih, <u>AutoCAD 2022 Tutorial Second Level 3D Modeling</u>, SDC Publications, 2021
Alternative Textbooks:	
Required Supplementary Readings:	
Other Required Materials:	Memory storage device Pencils and erasers for sketching Notebook/binder Calculator Ruler - inch with measurements down to 1/16"
Requisite:	
Category:	
Requisite course(s): List both prerequisites and corequisites in this box.	
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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Enrollment Limitations and Category:	

Enrollment Limitations Impact:	
Course Created by:	John Carr
Date:	02/22/2016
Original Board Approval Date:	09/01/1990
Last Reviewed and/or Revised by:	Vince Phamdo
Date:	03/14/2023
Last Board Approval Date:	07/17/2023 effective FALL 2024