Course Information Form (CIF)

Course Code: CAD 113

Course Title: Computer-Aided Machine Design I

Department: Applied Sciences and Technologies
PCS Code: 1.2 - Occupational/Technical Instruction
CIP Code: 47.0303
Repeatability: 0

Effective Date: Summer 2026

Credit Hours

Catalog Notation: 4-0-4
Credit Hour Distribution:

Lecture: 4	Lab: 0	Clinical: 0	**Total: 4**

General Course Information

Catalog Description

Design process with practical and computer-aided evaluation of power transmission devices, including gears, shafts, belts, chains, and other components using SolidWorks software.

General Course Objectives

Students will understand the design process as well as the characteristics of various machine components.

Minimum Placement Levels

English	Reading	Math
Placement into ENG 098	Placement out of CCS 099	Placement out of MAT 072

Prerequisites

None

Methods of Evaluation

The minimum number of evaluation methods include: 4 projects, 2 written exams, and 1 final project.

Instructional Materials and Additional Supplies

Beginning Guide to SolidWorks, Level 1, current edition, by Alejandro Reyes.

Course Content

General Learning Outcomes (GLOs)

- Communication: Students will demonstrate the ability to read, write, listen, and speak effectively.
- Reasoning and Inquiry: Students will demonstrate the ability to solve problems using deductive reasoning and logic, quantitative reasoning, or the scientific method.
- Technology: Students will demonstrate the ability to evaluate, select, and appropriately use current and emerging tools.

Course Segments and Student Learning Outcomes

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Gearing Theory	1. Articulate the theory and design principles of involute, worm, and epicyclical gearing.	2	0	0
Modeling of Gearing Designs	1. Create 3-dimensional models of various spur and worm gear drives. 2. Create simulations of the drive systems.	8	0	0
Belts, Chains, and Flexible Couplings Theory	1. Articulate the advantages and disadvantages of power transmission devices and their design considerations.	2	0	0
Modeling of Belt and Chain Drive Systems	1. Create 3-dimensional models of various belt and chain drive systems. 2. Create the devices used to couple the systems together. 3. Create simulations of the power transmission systems.	8	0	0
Shaft Coupling Theory	1. Articulate the various methods of shaft couplings and advantages and disadvantages of each, including: a) sleeve, b) flanged, c) split, and d) flexible.	2	0	0
Modeling of Shaft Couplings	1. Perform simulation and modeling techniques on several types of shaft couplings.	8	0	0
Mechanical Assembly Methods Theory	1. Articulate the types of mechanical assembly methods used in the construction of machinery: a) temporary, b) semi-permanent, and c) permanent.	3	0	0
Libraries of Fasteners	1. Locate, access, and insert the libraries of fasteners necessary to complete assemblies in the 3-dimensional modeling environment.	2	0	0
Axles and Shafts	1. Describe the design problems of transmitting power such as load and key seats and the materials involved.	2	0	0
Modeling of Axles and Shafts	1. Demonstrate the modeling techniques necessary to design robust power transmission equipment.	8	0	0
Modeling of a Worm Drive Assembly	1. Create a 3-dimensional model for a working gear reduction drive assembly, including: a) housing, b) cover, c) fasteners, d) shaft, e) bearings, and f) worm drive components.	15	0	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
60	0	0