

Course Information Form (CIF)

Course Code: ENS 101 (IAI EGR 941)

Course Title: Introduction to Engineering and CAD

Department: Natural Sciences

Effective Date: Summer 2026

PCS Code: 1.1 - Baccalaureate/Transfer

CIP Code: 15.1302

Repeatability: 0

Credit Hours

Catalog Notation: 2-3-3

Credit Hour Distribution:

Lecture: 2

Lab: 3

Clinical: 0

Total: 3

General Course Information

Catalog Description

An introduction to engineering design and graphics, including design problems, sketching, dimensioning, tolerancing, multi-view orthographic representations, auxiliary views, section views, and working drawings.

General Course Objectives

Sketching and CAD techniques will be integrated in this course to achieve the following outcomes: analyze the engineering function of existing products; apply design principles and rationale in a realistic and original design project; work in a team to generate, analyze, evaluate, and select among engineering design solutions to meet specified requirements; demonstrate proficiency in freehand sketching to communicate design ideas; demonstrate spatial visualization and reasoning skills by using 3D parametric solid modeling analysis; and interpret and create working drawings (3D CAD model files)

Minimum Placement Levels

English	Reading	Math
None	Placement out of CCS 098	Credit in MAT 128 with a grade of C or higher, or placement

Prerequisites

None

Methods of Evaluation

At least 10 in-class studio activities such as sketching or creating CAD models and drawings of isometric, orthographic and sectional views of physical objects and assemblies; 2-4 in-class exams assessing student graphical communication proficiency (sketching and CAD); 1 major interdisciplinary group project which includes reverse engineering, designing, creating 3D CAD models (possibly) to be produced with 3D printer, testing functional physical model, iterating the previous two steps, documenting project with 3D CAD model files, and presenting the project to the class at the end of the semester.

Instructional Materials and Additional Supplies

Engineering Fundamentals: An Introduction to Engineering, Saeed Moaveni. Cengage Learning.

Since students are required to build a functional physical model, there will be an estimated \$75 of consumable supplies or 3D printer expenses per student.

Course Content

General Learning Outcomes (GLOs)

- 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
Design Process	1. Analyze the engineering function of existing products. 2. Apply design principles and rationale in a realistic and original design project. 3. Work in a team to generate, analyze, evaluate, and select among engineering design solutions to meet specified requirements. 4. Create functional description of the design intent. 5. Develop design objectives. 6. Build functional physical model and test it. 7. Communicate the results of the design process, including working drawings and verbal and written presentations.	12	20	0
Sketching	1. Demonstrate proficiency in freehand sketching to communicate design ideas.	2	1	0
Orthographic Views	1. Convert between pictorial and multi-views.	3	3	0
Sectional Views	1. Use CAD to construct sectional views. 2. Create appropriate section view(s) from given orthographic views.	2	2	0
Auxiliary Views	1. Use CAD to accurately construct auxiliary views from either given orthographic views or from CAD 3D model. 2. Find true sizes, distances, and angles between points, lines, and planes in three dimensions.	3	3	0
Dimensioning	1. Use CAD to create a properly dimensioned and toleranced multi-view drawing (CAD file).	3	3	0

Course Segment	Learning Outcomes	Lecture Hours	Lab Hours	Clinical Hours
Tolerancing	1. Design object tolerances.	2	3	0
Three-dimensional Computer-aided Parametric Modeling Analysis	1. Demonstrate spatial visualization and reasoning skills by using 3D parametric solid modeling analysis.	3	10	0

Total Contact Hours

Lecture Hours	Lab Hours	Clinical Hours
30	45	0