ENGR 25 Course Outline as of Summer 2021

CATALOG INFORMATION

Dept and Nbr: ENGR 25 Title: ENGR GRAPHICS & DESIGN
Full Title: Engineering Graphics and Design
Last Reviewed: 2/24/2020

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
Students will develop three-dimensional visualization and design skills using freehand sketching and solid modeling software. Design projects will develop teamwork and project skills as well as an understanding of the industry standards for mechanical engineering drawings.

Prerequisites/Corequisites:
Course Completion of MATH 58 OR MATH 27 or higher (MATH)

Recommended Preparation:
Course Completion of APTECH 46

Limits on Enrollment:

Schedule of Classes Information:
Description: Students will develop three-dimensional visualization and design skills using freehand sketching and solid modeling software. Design projects will develop teamwork and project skills as well as an understanding of the industry standards for mechanical engineering drawings. (Grade Only)
Prerequisites/Corequisites: Course Completion of MATH 58 OR MATH 27 or higher (MATH)
Recommended: Course Completion of APTECH 46

Limits on Enrollment:
Transfer Credit: CSU;UC.
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Spring 1989	Inactive:	
UC Transfer:	Transferable	Effective:	Spring 1989	Inactive:	

CID:

Certificate/Major Applicable:
Major Applicable Course

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Convert between two-dimensional and three-dimensional representations of mechanical objects both manually on paper and in a computer aided design environment.
2. Prepare and interpret mechanical engineering drawings using industry documentation standards and practices.
3. Apply team skills and a formal design algorithm to the design and construction of engineering related projects.

Objectives:
At the conclusion of this course, the student should be able to:
1. Make freehand pictorial and orthographic sketches of objects.
2. Construct auxiliary views and section views.
3. Apply the terminology and standards of geometric tolerancing to mechanical working drawings.
4. Construct solid models, working drawings, and assemblies of objects using feature based computer aided design (CAD) software.
5. Apply teamwork skills in group activities and projects.
6. Describe models of the engineering design process and their key common features.

Topics and Scope:

All of these topics will be covered in both lecture and lab formats using freehand sketching and CAD software:
I. Pictorial and Orthographic Views
II. Primary Auxiliary Views of Objects
III. Section and Detail Views
IV. Conventional Dimensioning and Tolerancing
V. Geometric Dimensioning and Tolerancing Basics

VI. Threaded Fastener Terminology
VII. Algorithms for the Engineering Design Process
VIII. Concurrent Engineering and Design for Manufacturing Concepts
IX. Documentation Standards for Engineering Projects
X. Feature Based Parametric Solid Modeling
XI. Part Drawing Construction and Annotation
XII. Assembly Drawing Construction
XIII. Introduction to Finite Element Analysis
XIV. Introduction to Rapid Prototyping
XV. Engineering Design Team Skills
XVI. Common Requirements for Oral Engineering Presentations

Assignment:

1. Manual worksheets (15-30)
2. CAD drawings (15-30)
3. Design project documentation portfolio(s) (1-2)
4. Constructed model(s) for engineering design project (1-2)
5. Individual or group oral presentation(s) (1-2)
6. Midterm exams (2-4)
7. Final exam

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments and skill demonstrations are more appropriate for this course.	Writing 0 - 0%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Manual worksheets	Problem solving 10 - 25%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

CAD drawings, oral presentation(s)	Skill Demonstrations 20 - 40%

Exams: All forms of formal testing, other than skill performance exams.

Midterm exams and final exam	Exams 25 - 40%

Other: Includes any assessment tools that do not logically fit into the above categories.

Project design portfolio(s), constructed model(s) for engineering design project	Other Category 10 - 30%

Representative Textbooks and Materials:
Engineering Design Graphics with Autodesk Inventor 2017. Bethune, James. Peachpit Press. 2017
Autodesk Inventor 2020 and Engineering Graphics. Shih, Randy. SDC Publications. 2020
Engineering Graphics Principles with Geometric Dimensioning and Tolerancing. Raisor, E. Max. SDC Publications. 2017
Instructor prepared materials