ENGR 25 Course Outline as of Fall 2019

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	2.50	17.5	Lecture Scheduled	43.75
Minimum	3.00	Lab Scheduled	1.50	6	Lab Scheduled	26.25
		Contact DHR	0		Contact DHR	0
		Contact Total	4.00		Contact Total	70.00
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 87.50 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 25 and MATH 58; OR Completion of 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 25 and MATH 58; OR Completion of

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 an engineering related project.

Objectives:
Upon successful completion of the course, students will be able to:
1. Make freehand pictorial, isometric 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.
1. Isometric and orthographic views
2. Primary auxiliary views of objects
3. Section and detail views

4. Conventional dimensioning and tolerancing
5. Geometric dimensioning and tolerancing basics
6. American National Standards Institute hole basis fits
7. Algorithms for the engineering design process
8. Concurrent engineering and design for manufacturing concepts
9. Documentation standards for engineering projects
10. Feature based parametric solid modeling
11. Part drawing construction and annotation
12. Assembly drawing construction
13. Introduction to finite element analysis
14. Introduction to rapid prototyping
15. Engineering design team skills
16. Common requirements for oral engineering presentations

Assignment:

1. Manual worksheets (20-40)
2. CAD drawings (15-30)
3. Design project documentation portfolios (1-2)
4. Constructed models for engineering design project (1-2)
5. Individual or group oral presentations (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 presentations	Skill Demonstrations 20 - 40%

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

Exams: Short Answer, manual sketching and solutions, CAD models and drawings	Exams 25 - 40%

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

Project design portfolio, constructed project	Other Category 10 - 30%

Representative Textbooks and Materials:

Bethune, Engineering Design Graphics with Autodesk Inventor 2013, Peachpit Press, 2013
Shih, Parametric Modeling with Autodesk Inventor 2013, SDC Publications, 2013
Sexton, A Concise Intro to Engineering Graphics, 4th Edition, SDC Publications, 2010
Instructor prepared materials