

ENGI-122: ENGINEERING GRAPHICS & DESIGN

Engineering Courses Updates Fall 2023

Course

- ENGI-110: Introduction to Engineering
- ENGI-122: Engineering Graphics & Design
- ENGI-160: Programming With MATLAB for Engineers and Scientists
- ENGI-240: Properties of Materials
- ENGI-241: Engineering Mechanics: Statics
- ENGI-242: Circuits 1

Effective Term

Fall 2024

CC Approval

10/06/2023

AS Approval

10/10/2023

BOT Approval

10/19/2023

COCI Approval

3/12/2024

SECTION A - Course Data Elements

Send Workflow to Initiator

No

CB04 Credit Status

Credit - Degree Applicable

Discipline

Minimum Qualifications

And/Or

Engineering (Master's Degree)

Subject Code

ENGI - Engineering

Course Number

122

Department

Engineering (ENGI)

Division

Science and Engineering (SE)

Full Course Title

Engineering Graphics & Design

Short Title

Engineering Graphics & Design

CB03 TOP Code

0901.00 - Engineering, General (requires Calculus) (Transfer)

CB08 Basic Skills Status

NBS - Not Basic Skills

CB09 SAM Code

E - Non-Occupational

Rationale

Last update more than 6 years ago.

SECTION B - Course Description

Catalog Course Description

Introduction to the engineering design process and graphical communications tools used by engineers. The fundamentals of orthographic projection, pictorial sketching, dimensioning and tolerancing, and their application in the solution of engineering problems. Use of the computer-aid design package, and AutoCAD, as an analysis, design and documentation tool.

SECTION C - Conditions on Enrollment

Open Entry/Open Exit

No

Repeatability

Not Repeatable

Grading Options

Letter Grade Only

Allow Audit

Yes

Requisites

SECTION D - Course Standards

Is this course variable unit?

No

Units

4.00000

Lecture Hours

36.00

Lab Hours

108.00

Outside of Class Hours

72

Total Contact Hours

144

Total Student Hours

216

Distance Education Approval

Is this course offered through Distance Education?

Yes

Online Delivery Methods

DE Modalities	Permanent or Emergency Only?
Entirely Online	Permanent
Hybrid	Permanent
Online with Proctored Exams	Permanent

SECTION E - Course Content**Student Learning Outcomes**

Upon satisfactory completion of the course, students will be able to:	
1.	Be able to understand and explain the fundamentals of drafting standards, drawing scales, geometric constructions, orthographic projections, sectioning, dimensioning, tolerancing, and computer-aided design (CAD) tools and their application.
2.	Demonstrate knowledge and understanding of the principles and concepts of graphical communications within the framework of civil, electrical, and mechanical engineering.
3.	Implement design projects related to civil, electrical, and mechanical engineering while applying while applying the engineering design process and graphical skills and techniques.

Course Objectives

Upon satisfactory completion of the course, students will be able to:	
1.	Communicate ideas through engineering sketching, cartooning and formal drawings.
2.	Construct working drawings complete with dimensions and tolerancing following all ANSI standard conventions.
3.	Graphically analyze engineering problems.
4.	Use AutoCAD LT as a graphical analysis, design and documentation tool to create: A. 2D engineering drawings, including working drawings and assembly drawings. B. 3D models and assemblies
5.	Work in groups to construct a final design project which includes the following: A. Create a large and varied list of ideas through brainstorming and other creative techniques. B. Compare design ideas and choose the best solutions to analyze in detail. C. Select the most promising idea, construct working drawings of the device, and build it. D. Demonstrate the effectiveness of the device and orally present the design process to the class. E. Prepare a detailed technical report of the design project.

Course Content

1. Engineering Graphics
 - a. Introduction to engineering graphics - History of graphics
 - b. The computer in design and graphics
 - c. Introduction to AutoCAD computer graphics
 - d. Sketching and cartooning
 - e. Orthographic Sketching - Standard view and conventions in orthographic projections
 - f. Three-dimensional Pictorials - Isometric and oblique pictorial
 - g. Sectional views
 - h. Dimensioning
 - i. Tolerances
 - j. Working drawings
 - k. Orthographic and pictorial assembly drawings
2. Engineering Design
 - a. Working in a team environment
 - b. Creativity
 - c. The design process
 - i. Problem identification
 - ii. The preliminary idea phase
 - iii. Idea refinement
 - iv. Design analysis
 - v. Deciding on a final design
 - d. Solid modeling
 - e. Assembly modeling

- f. Design analysis
- g. Fabrication process
- h. Design documentation

Methods of Instruction

Methods of Instruction

Types	Examples of learning activities
Lecture	Presentation of content material
Discussion	Exploring Engineering Design, The Ingenious Design of the Aluminum Can, Sustainable Design, A Mark of Good Design, Can Graphics & CAD be used outside of Engineering?
Lab	Reverse Engineering, Scale Drawing, Build Something, Bridge Design, Circuits Schematics
Activity	Campus Mapping, Scale Drawing, Cardboard Project (Problem Statement, Design Criteria, Design Constraints, Survey, Research, Prototypes, Scale Model)

Instructor-Initiated Online Contact Types

Announcements/Bulletin Boards
 Chat Rooms
 Discussion Boards
 E-mail Communication
 Video or Teleconferencing

Student-Initiated Online Contact Types

Chat Rooms
 Discussions
 Group Work

Course design is accessible

Yes

Methods of Evaluation

Methods of Evaluation

Types	Examples of classroom assessments
Projects	Prototypes/Models/Sketches Reports
Homework	End of the chapter design problems.
Exams/Tests	Final Exam Mid Term
Other	AutoCAD Labs Group Design Project

Assignments

Reading Assignments

Read Chapter 7: Auxiliary Views
 Read Chapter 8: Dimensioning
 Read Chapter 9: Tolerancing & Fits
 Read Chapter 10: Geometric Dimensioning & Tolerancing

Writing Assignments

Read from assigned text and class handouts.
 Complete weekly homework assignments.
 Produce working drawings using AutoCAD.
 Complete a group design project which will involve some meetings outside of class time.
 Write a technical report describing the completed design project.

SECTION F - Textbooks and Instructional Materials**Material Type**

Textbook

Author

James D. Bethune and David Byrnes

Title

Engineering Graphics with AutoCAD 2023

Edition/Version

1st

Publisher

Pearson

Year

2023

ISBN #

978-0137929993

Material Type

Textbook

Author

Randy H. Shih

Title

Principles and Practice An Integrated Approach to Engineering Graphics and AutoCAD 2022

Edition/Version

1st

Publisher

SDC Publications

Year

2022

ISBN #

978-1630574291

Proposed General Education/Transfer Agreement

Do you wish to propose this course for a UC Transferable Course Agreement (UC-TCA)?

No

Course Codes (Admin Only)**ASSIST Update**

No

C-ID Approval Dates**C-ID Descriptor**

N/A currently

Approval Date

CB00 State ID

CCC000269230

CB10 Cooperative Work Experience Status

N - Is Not Part of a Cooperative Work Experience Education Program

CB11 Course Classification Status

Y - Credit Course

CB13 Special Class Status

N - The Course is Not an Approved Special Class

CB23 Funding Agency Category

Y - Not Applicable (Funding Not Used)

CB24 Program Course Status

Not Program Applicable

Allow Pass/No Pass

No

Only Pass/No Pass

No

Reviewer Comments

Stacey Howard (showard) (Thu, 28 Sep 2023 17:52:53 GMT): Added anticipated Fall 2023 effective date as no rearticulation required.

Stacey Howard (showard) (Thu, 28 Sep 2023 18:25:31 GMT): Selected anticipated fall 2023 begin date as no rearticulation required for existing CSU/UC transferability. No matching C-ID descriptor currently.

Stacey Howard (showard) (Thu, 28 Sep 2023 18:26:38 GMT): Correction on last comment: Anticipated fall 2024 implementation.

Stacey Howard (showard) (Thu, 28 Sep 2023 18:45:37 GMT): ENGI 160 - Anticipated Fall 2024 begin date of COR update ok as no rearticulation for CSU/UC transferability required. Changed term from fall 2025 to 2024. Please add "group" to term or final project. Highly recommended to add this as UC Davis will not articulate this course for any applicable major agreement in ASSIST without inclusion of a group term project. Thank you!

Stacey Howard (showard) (Thu, 28 Sep 2023 19:21:38 GMT): ENGR 242 - Suggestion addition of Differential Equations (C-ID MATH 240) as co-requisite. Previous C-ID denial due to missing co-req as per C-ID ENGR 260 descriptor and reviewer.

Stacey Howard (showard) (Thu, 28 Sep 2023 19:58:57 GMT): ENGI 240 - Anticipated fall 2024 implementation ok as CSU/UC rearticulation is not required.

Stacey Howard (showard) (Thu, 28 Sep 2023 20:10:50 GMT): ENGR 241 - Anticipated begin date of fall 2024 ok as CSU/UC rearticulation not required. C-ID ENGR 130 submission expired. Resubmission required.