



El Camino College
COURSE OUTLINE OF RECORD – Approved

I. GENERAL COURSE INFORMATION

Subject and Number: Engineering Technology 12B
Descriptive Title: Introduction to Engineering Design II
Course Disciplines: Engineering Technology AND Drafting
Division: Industry and Technology
Catalog Description:

This course is the second of two courses in which students are introduced to the basics of the design process used in engineering fields and the application of computer modeling software. Emphasis is placed on, modeling, model documentation, assemblies and production processes.

Note: The two-course sequence Engineering Technology 12A and Engineering Technology 12B is the same as Engineering Technology 12.

Conditions of Enrollment:

Recommended Preparation: Engineering Technology 12A

Course Length:	X Full Term	Other (Specify number of weeks):
Hours Lecture:	1.00 hours per week	TBA
Hours Laboratory:	2.00 hours per week	TBA
Course Units:	1.50	

Grading Method: Letter
Credit Status: Associate Degree Credit

Transfer CSU: X Effective Date: 12/15/2008
Transfer UC: No

General Education:
El Camino College:

CSU GE:

IGETC

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. SLO #1 Two and Three-Dimensional Models

Given a simple set of design constraints, the student shall be able utilize AutoCad Inventor software to produce a design package including two-dimensional drawings and three-dimensional models.

2. SLO #2 Design Project

Upon completion of the course, the student shall be able to take a design project from problem statement to final production drawings.

3. SLO #3 Design Process

Upon completion of the course, the student shall be able to describe the steps of the design process and give examples of documents appropriate for each step.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Apply dimensions and tolerances in accordance with industry standards.
Performance exams
1. Modify features on engineering drawings and models.
Performance exams
2. Extract mass properties from solid models.
Performance exams
3. Compare and contrast manufacturing materials and production processes.
Homework Problems

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	1	I	Overview of Engineering Design II A. Design process overview B. Computer Aided Design and Drafting (CADD) software orientation
Lab	2	II	Overview of Engineering Design II A. Computer use exercise B. CADD software orientation
Lecture	3	III	Model Assemblies A. Assembly modeling, assembly constraints B. Parts libraries C. Model analysis
Lab	6	IV	Model Assemblies A. Computer modeling exercise B. Model assembly exercise
Lecture	8	V	Model Documentation A. Dimensioning B. Annotation
Lab	16	VI	Model Documentation A. Drawing generation exercise B. Drawing annotation exercise
Lecture	6	VII	Production A. Design manufacturability B. Process planning C. Material procurement D. Cost analysis and quality control E. Packaging
Lab	12	VIII	Production A. Manufacturability exercise B. Production processes exercise
Total Lecture Hours		18	
Total Laboratory Hours		36	
Total Hours		54	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Given a set of detail models for the "Skate Board Truck," create an assembly model and the requisite drawings. Plot the drawings and submit drawings to the instructor.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. Create an orthographic sketch of the idler arm on CADD software and measure the features with digital calipers. Create a three-dimensional solid model based on the sketch and recorded dimensions. Post the model file on the class website for critique and submit to the instructor.
2. Using the Mass Properties function on CADD software, analyze the series of design problems provided. The problems selected require the use of various materials and mass property calculations to answer a series of questions on production, shipping, raw materials and design improvements. Enter the data on the forms provided and submit to the instructor.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

Performance exams

Other exams

Quizzes

Written homework

Laboratory reports

Class Performance

Homework Problems

Multiple Choice

Completion

Matching Items

True/False

V. INSTRUCTIONAL METHODS

Demonstration

Laboratory

Lecture

Multimedia presentations

Other: Computer simulations

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

Study

Answer questions

Required reading

Problem solving activities

Estimated Independent Study Hours per Week: 2

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Michael Hacker. Engineering & Technology. 1st ed. Delmar Cengage Learning, 2010.
Qualifier Text: INDUSTRY STANDARD,

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

Project Lead the Way (PLTW) material and handouts

D. OTHER REQUIRED MATERIALS

3-ring binder
Flash drive

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
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B. Requisite Skills

Requisite Skills

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Course Recommended Preparation Engineering Technology-12A	

D. Recommended Skills

Recommended Skills
Create three dimensional solid models using CADD software. ETEC 12A -Produce two-dimensional drawings and three-dimensional models using Computer Aided Design and Drafting (CADD) software.
Identify different geometric features of 3D modeled object. ETEC 12A - Identify geometric constraints in three-dimensional models.

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact
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Course created by Richard Hughes on 09/01/2008.

BOARD APPROVAL DATE: 12/15/2008

LAST BOARD APPROVAL DATE: 01/21/2020

Last Reviewed and Revised by: DANIEL VALLADARES

Date: 10/15/2019

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