

## ENGR111 : Computer Aided Design SOLIDWORKS I

### General Information

Author:	<ul style="list-style-type: none"><li>Christopher Herwerth</li></ul>
Course Code (CB01) :	ENGR111
Course Title (CB02) :	Computer Aided Design SOLIDWORKS I
Department:	ENGR
Proposal Start:	Spring 2025
TOP Code (CB03) :	(0924.00) Engineering Technology, General (requires Trigonometry)
CIP Code:	(15.0000) Engineering Technologies/Technicians, General.
SAM Code (CB09) :	Clearly Occupational
Distance Education Approved:	No
Will this course be taught asynchronously?:	No
Course Control Number (CB00) :	CCC000620916
Curriculum Committee Approval Date:	06/12/2024
Board of Trustees Approval Date:	07/16/2024
Last Cyclical Review Date:	06/12/2024
Course Description and Course Note:	ENGR 111 is a basic course in engineering, drafting and design, utilizing SOLIDWORKS software, with an emphasis on three-dimensional design, modeling, and engineering applications. Students learn the fundamentals of parametric modeling by creating parts, drawings and assemblies through industry based projects and activities. This course has applications in manufacturing, aerospace, automotive, and mechanical engineering design.
Justification:	Mandatory Revision
Academic Career:	<ul style="list-style-type: none"><li>Credit</li></ul>
Mode of Delivery:	No value
Author:	<ul style="list-style-type: none"><li>Christopher Herwerth</li></ul>
Course Family:	No value

### Academic Senate Discipline

Primary Discipline:	<ul style="list-style-type: none"><li>Engineering Support (Surveying, engineering aides)</li></ul>
Alternate Discipline:	No value
Alternate Discipline:	No value

## Course Development

### Basic Skill Status (CB08)

Course is not a basic skills course.

Allow Students to Gain Credit by Exam/Challenge

### Course Special Class Status (CB13)

Course is not a special class.

### Pre-Collegiate Level (CB21)

Not applicable.

### Grading Basis

- Grade with Pass / No-Pass Option

### Course Support Course Status (CB26)

Course is not a support course

## General Education and C-ID

### General Education Status (CB25)

Not Applicable

### Transferability

Transferable to CSU only

### Transferability Status

Approved

## Units and Hours

### Summary

**Minimum Credit Units (CB07)** 3

**Maximum Credit Units (CB06)** 3

**Total Course In-Class (Contact) Hours** 108

**Total Course Out-of-Class Hours** 54

**Total Student Learning Hours** 162

### Credit / Non-Credit Options

#### Course Type (CB04)

Credit - Degree Applicable

#### Noncredit Course Category (CB22)

Credit Course.

#### Noncredit Special Characteristics

No Value

#### Course Classification Code (CB11)

Credit Course.

Variable Credit Course

#### Funding Agency Category (CB23)

Not Applicable.

Cooperative Work Experience

Education Status (CB10)

### Weekly Student Hours

	In Class	Out of Class
Lecture Hours	1.5	3
Laboratory Hours	4.5	0
Studio Hours	0	0

### Course Student Hours

<b>Course Duration (Weeks)</b>	18
<b>Hours per unit divisor</b>	0
<b>Course In-Class (Contact) Hours</b>	
Lecture	27
Laboratory	81
Studio	0

**Total** 108

**Course Out-of-Class Hours**

Lecture	54
Laboratory	0
Studio	0
<b>Total</b>	54

**Time Commitment Notes for Students**

No value

**Units and Hours - Weekly Specialty Hours**

Activity Name	Type	In Class	Out of Class
No Value	No Value	No Value	No Value

**Pre-requisites, Co-requisites, Anti-requisites and Advisories**

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**Prerequisite**

ENGR101 - Engineering Drafting And Basic Design (in-development)

**Objectives**

- Demonstrate rules of orthographic projection by creating detailed multi-view drawings.
- Analyze an object and create auxiliary and section views of its features when necessary.
- Explain the glass box theory and the geometric relationships of orthographic views.

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**OR**

**Prerequisite**

ENGR122 - Engineering Graphics

**Objectives**

- Apply the principles of orthographic projection to create complete multi-view engineering drawings.
  - Create clear and concise auxiliary and section views of an object using industry standards.
  - Demonstrate proficiency in coordinate dimensioning and tolerancing of engineering drawings.
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## Entry Standards

Entry Standards

## Course Limitations

Cross Listed or Equivalent Course

## Specifications

### Methods of Instruction

Methods of Instruction                      Lecture

Methods of Instruction                      Laboratory

Methods of Instruction                      Multimedia

Methods of Instruction                      Collaborative Learning

Methods of Instruction                      Demonstrations

Methods of Instruction                      Guest Speakers

### Out of Class Assignments

- Problem sets using CAD software
- Short essay (e.g. essay on the uses of geometric dimensioning and tolerancing, GD and T in green manufacturing)
- Group project (e.g. design project of a flash light with all components, assembly drawings and presentation)

### Methods of Evaluation

### Rationale

Exam/Quiz/Test

Midterm exam

Exam/Quiz/Test

Final exam (e.g. handwritten and computer based final examination)

Exam/Quiz/Test

Alternate final exam (e.g. SOLIDWORKS Certified Associate exam, industry certification as optional final exam)

### Textbook Rationale

No Value

### Textbooks

Author	Title	Publisher	Date	ISBN
Planchard, David C.	Engineering Design with SOLIDWORKS 2024	Mission KS: SDC Publications	2024	978-1-63057-627-1

### Other Instructional Materials (i.e. OER, handouts)

No Value

### Materials Fee

No value

## Learning Outcomes and Objectives

### Course Objectives

Complete a series of problems demonstrating basic knowledge and skills in utilizing a computer aided drafting system.

Demonstrate a basic knowledge of computer aided manufacturing by completion of a series of engineering documents.

Utilize the computer system to complete a series of basic design problems.

Exhibit a working knowledge of the operating system commands through the completion of a comprehensive engineering design problem.

Demonstrate all aspects of sketching including geometrics, types of lines, dimensions, and modifications.

Practice standard drawing procedures and content such as number of views, type of views, appropriate dimensions to call out in views, details in title block, and basic geometric tolerancing.

Construct working drawings, configuration, and assemblies.

### SLOs

Demonstrate all sketching elements to complete a fully constrained model.

Expected Outcome Performance: 70.0

<i>ILOs</i> Core ILOs	Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.
	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
<i>ENGR</i> Civil Engineering	Apply knowledge of mathematics, science and engineering; identify, form and solve engineering problems
	Demonstrate introductory skills using modern engineering tools necessary for engineering practice.
<i>ENGR</i> Engineering Technology - CAD & Design Drafting	Demonstrate skills in the production of working drawings of engineering structures
	Demonstrate techniques to accomplish drawings and 3D models utilizing different various computer aided design (CAD) software
<i>ENGR</i> Engineering Entrepreneurship Skill Award	Learn the engineering design process and how technical products are made, assembled, and integrated into complex systems.
<i>ENGR</i> Computer Engineering AS	demonstrate appropriate technical written, verbal, drawing, and communication skills;
	design a system, component, or process with supervision of a licensed engineer to meet desired needs.
<i>ENGR</i> Mechanical Engineering - A.S. Degree Major	demonstrate appropriate technical written, verbal, drawing, and communication skills;
<i>ENGR</i> Electrical Engineering A.S. Degree Major	demonstrate appropriate technical written, verbal, drawing, and communication skills;
<b>Practice parametric 3D modeling.</b>	
Expected Outcome Performance: 70.0	
<i>ENGR</i> Civil Engineering	Apply knowledge of mathematics, science and engineering; identify, form and solve engineering problems
	Demonstrate introductory skills using modern engineering tools necessary for engineering practice.
<i>ILOs</i> Core ILOs	Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.
<i>ENGR</i> Engineering Technology - CAD & Design Drafting	Demonstrate skills in the production of working drawings of engineering structures
	Demonstrate techniques to accomplish drawings and 3D models utilizing different various computer aided design (CAD) software
<i>ENGR</i> Engineering Entrepreneurship Skill Award	Learn hands-on skills and problem solving techniques for businesses related to engineering design, installation, manufacturing, testing, technical sales, maintenance, and other such topics in engineering technology.
	Learn the engineering design process and how technical products are made, assembled, and integrated into complex systems.
<i>ENGR</i> Computer Engineering AS	demonstrate appropriate technical written, verbal, drawing, and communication skills;
	design a system, component, or process with supervision of a licensed engineer to meet desired needs.
<i>ENGR</i> Mechanical Engineering - A.S. Degree Major	use science and mathematical skills required for occupational needs;
<i>ENGR</i> Electrical Engineering A.S. Degree Major	use science and mathematical skills required for occupational needs;

**Employ SOLIDWORKS software to create all design elements that completes a design package according to industry standards.**

Expected Outcome Performance: 70.0

ILOs  
Core ILOs

Analyze and solve problems using critical, logical, and creative thinking; ask questions, pursue a line of inquiry, and derive conclusions; cultivate creativity that leads to innovative ideas.

Demonstrate depth of knowledge in a course, discipline, or vocation by applying practical knowledge, skills, abilities, theories, or methodologies to solve unique problems.

ENGR  
Civil Engineering

Apply knowledge of mathematics, science and engineering; identify, form and solve engineering problems

Demonstrate introductory skills using modern engineering tools necessary for engineering practice.

ENGR  
Engineering Technology - CAD &  
Design Drafting

Demonstrate skills in the production of working drawings of engineering structures

Demonstrate techniques to accomplish drawings and 3D models utilizing different various computer aided design (CAD) software

ENGR  
Engineering Entrepreneurship Skill  
Award

Learn the engineering design process and how technical products are made, assembled, and integrated into complex systems.

ENGR  
Computer Engineering AS

demonstrate appropriate technical written, verbal, drawing, and communication skills;

design a system, component, or process with supervision of a licensed engineer to meet desired needs.

ENGR  
Mechanical Engineering - A.S.  
Degree Major

demonstrate appropriate technical written, verbal, drawing, and communication skills;

use science and mathematical skills required for occupational needs;

ENGR  
Electrical Engineering A.S. Degree  
Major

demonstrate appropriate technical written, verbal, drawing, and communication skills;

use science and mathematical skills required for occupational needs;

## Additional SLO Information

**Does this proposal include revisions that might improve student attainment of course learning outcomes?**

No

**Is this proposal submitted in response to learning outcomes assessment data?**

No

**If yes was selected in either of the above questions for learning outcomes, explain and attach evidence of discussions about learning outcomes.**

No Value

**SLO Evidence**

No Value

# Course Content

## Lecture Content

### Introduction (1 hour)

- Constraint-based solids modeling
- Solids modeling

### SOLIDWORKS Basics (2 hours)

- Options settings
- Starting a drawing
- Creating a new part
- Modeling a part

### Geometric Construction (3 hours)

- Lines, circles and points
- Line types
- Fillets and rounds
- Chamfers
- Rotations
- Mirroring
- Creation of Splines

### Dimensioning (3 hours)

- Dimensioning a sketch
- Changing dimensions
- Dimensional placement
- Sections

### Modeling a Part (3 hours)

- Part sketching
- Modifying a sketch
- Extruding a sketch

### Modeling an Assembly (3 hours)

- Creating an assembly document
- Modifying an assembly document
- Insertion of sub-assemblies
- Creating exploded views

### Working Drawings (3 hours)

- Creating working drawings
- Option settings
- Modifying formats, geometry and text

### Modification of Drawings (3 hours)

- Component interface checking
- Customizing procedures
- Modifying colors and text fonts
- Modifying configuration dimensions

### Mass Properties Dialog Box (4 hours)

- Use and modification of dialog boxes

### Design Project (2 hours)

- Working in teams
- Project selection, proposal and iteration
- Generation of models, assemblies, and engineering drawings
- Project presentation (oral and written report)

**Total Hours: 27**

## Laboratory/Studio Content

### Introduction (4 hours)

- Constraint-based solids modeling
- Solids modeling

### SOLIDWORKS Basics (8 hours)

- Options settings
- Starting a drawing
- Creating a new part

- Modeling a part

### **Geometric Construction (9 hours)**

- Lines, circles and points
- Line types
- Fillets and rounds
- Chamfers
- Rotations
- Mirroring
- Creation of Splines

### **Dimensioning (9 hours)**

- Dimensioning a sketch
- Changing dimensions
- Dimensional placement
- Sections

### **Modeling a Part (7 hours)**

- Part sketching
- Modifying a sketch
- Extruding a sketch

### **Modeling an Assembly (7 hours)**

- Creating an assembly document
- Modifying an assembly document
- Insertion of sub-assemblies
- Creating exploded views

### **Working Drawings (7 hours)**

- Creating working drawings
- Option settings
- Modifying formats, geometry and text

### **Modification of Drawings (7 hours)**

- Component interface checking
- Customizing procedures
- Modifying colors and text fonts
- Modifying configuration dimensions

### **Mass Properties Dialog Box (7 hours)**

- Use and modification of dialog boxes

### **Design Project (16 hours)**

- Working in teams
- Project selection, proposal and iteration
- Generation of models, assemblies, and engineering drawings
- Project presentation (oral and written report)

**Total Hours: 81**

## **Additional Information**

Is this course proposed for GCC Major or General Education Graduation requirement? If yes, indicate which requirement in the two areas provided below.

No

### **GCC Major Requirements**

No Value

### **GCC General Education Graduation Requirements**

No Value

### **Repeatability**

Not Repeatable

**Justification (if repeatable was chosen above)**

No Value

## **Resources**

**Did you contact your departmental library liaison?**

Yes

**If yes, who is your departmental library liaison?**

No Value

**Did you contact the DEIA liaison?**

No

**Were there any DEIA changes made to this outline?**

No Value

**If yes, in what areas were these changes made:**

No Value

**Will any additional resources be needed for this course? (Click all that apply)**

No Value

**If additional resources are needed, add a brief description and cost in the box provided.**

No Value