

## Course description

BSEN 130 - Introduction to CAD

Prerequisites: NONE

The focus will be primarily on Solidworks CAD software. Main points of interest include interface, part modeling, creating assemblies, and building working drawings with annotation. Also, we will cover the basics of weldments, sheet metal parts and an overview of analysis and simulation.

Credit hours: 2

## Instructor contact information

Jonathan Heithold

Preferred name: Jon

Preferred pronouns: He, him

Office location: none

Telephone: 402-525-8953 (cell, text is ok, too)

Email: [jheithold4@unl.edu](mailto:jheithold4@unl.edu)

Office hours: CH 148 from 4:15 to 9:30 PM on Mondays

## Learning Outcomes

In this course, we will look at the methods and tools for creating manufacturing-ready parts and assemblies, along with detailed drawings and a Bill of Materials. We will start with the basic sketch tools. Next, we will look at modeling 3D features by extruding or evolving sketches into 3D parts. Parts will be modified using a suite of tools that includes fillets, chamfers, rib, draft, and shell plus much more.

Next we'll learn how to create uniform standard hole sizes using the automated Hole Wizard. We will explore more advanced modeling techniques by using the Pattern, Mirror, and Equation tools. Then we will cover the best practice for putting parts together into assemblies and building robust structures. We will see how to create drawings to relate the final parts in assemblies to a manufacturer complete with an itemized Bill of Materials and drawing notes.

Finally, we will into more advanced tools such as Weldments, Sheet Metal and Finite Element Analysis towards the end of the course.

A general breakdown of the weeks ahead:

<b>WEEK</b>	<b>TOPIC(S)</b>
<b>1</b>	Introduction to Solidworks and the Interface
<b>2</b>	Basic Features, Relations, Additive Modeling
<b>3</b>	Advanced 2D sketching
<b>4</b>	3D Modeling
<b>5</b>	Preparing Part Drawings
<b>6</b>	Configurations, Hole Wizard, Toolbox
<b>7</b>	Assemblies
<b>8</b>	Surface Modeling
<b>9</b>	Surface Modeling
<b>10</b>	Rapid Prototyping
<b>11</b>	Weldments
<b>12</b>	Sheet Metal Parts
<b>13</b>	FEA-Static Stress and Thermal Analysis
<b>14</b>	Capstone Project—Parts, Assemblies, Drawings with Annotation
<b>15</b>	Capstone Project—Parts, Assemblies, Drawings with Annotation

### **ABET outcomes covered in this course**

From the list below, include the ABET student outcomes that you cover in your class. For each ABET outcome covered, explain to the opportunities to achieve the ABET student outcomes

(you can say in a module that they will be learning about ABET student outcome X), and identify which graded assignments will be used to assess the ABET student outcomes (e.g., Part II of your course project will be used to assess ABET student outcome X, or Problem 3 of Homework 6 will be used to assess ABET student outcome X). Doing this will help you make sure to collect this information each time you teach your course.

#### ABET Student Outcomes

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

#### Required materials

- students are welcome to use the computers in CH 116 that will be brought in weekly on a cart
- instructions will be provided to students to get a free download of Solidworks on a Windows OS computer
- face covering

#### Course assessments

Accuracy and presentation are the primary considerations of any CAD output. Any questions concerning a grade or grading should be directed to the instructor. The course will use the – and + system for scores. As an example, the course will use 80-82%=B-, 83-87%=B, 88-89%=B+.

Drawing Sets (3): 75 points Study Guides (3): 25 points

Total: 100 points

### Diversity & Inclusion

Respect for Diversity: It is my intent that students from all diverse backgrounds and perspectives be well served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture. All people have the right to be addressed and referred to in accordance with their personal identity. In this class, we will have the chance to indicate the name that we prefer to be called and, if we choose, to identify pronouns with which we would like to be addressed...I will do my best to address and refer to all students accordingly and support classmates in doing so as well. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally or for other students or student groups. In addition, if any of our class meetings conflict with your religious events, please let me know so that we can make arrangements for you.

### Attendance policy

- I do not take attendance for this course. However, you are expected to attend each Monday that we have class.

### Special policies

List all other policies including but not limited to:

- Please silence your cell phone during class time.
- Keep an eye on the Announcements tab for the class in case of last minute changes due to weather, illness, etc.

### Grading scale

Accuracy and presentation are the primary considerations of any CAD output. Any questions concerning a grade or grading should be directed to the instructor. The course will use the – and + system for scores. As an example, the course will use 80-82%=B-, 83-87%=B, 88-89%=B+.

Drawing Sets (3): 75 points

Study Guides (3): 25 points

Total: 100 points

**GRADE POINTS**

**A+, A, A- 90-100**

**B+, B, B- 80-89**

**C+, C, C- 70-79**

**D+, D, D- 60-69**

**F <60**