College-Level Engineering: Fusion 360 CAD Modeling Software: Dream It! Design It! Build It!

12 Saturdays, starting October 24, 2020

Session 1: October 24, 31 and November 14, 21, 2020
Session 2: January 23, 30, February 6, 13, 2021
Session 3: March 20, 27, April 3, 10, 2021

Class meets each Saturday via Zoom from 9:00am.- 11:00am.

Course Overview

3D Computer-Aided Design (CAD) modeling is a critical tool used in many Engineering applications and disciplines. Today’s professionals can model almost anything from common household items to planes, trains, and automobiles to homes, buildings, and bridges and even to replacement body parts for injured or disabled people and animals. It allows for quick modifications and iterative designs.

Autodesk Fusion 360 is one of the newest 3D CAD modeling tools in the AutoCAD® family. 3D modeling is technology for design and technical documentation, replacing manual drafting with an automated process. Used by architects, engineers, and other professionals, 3D CAD software precisely represents and visualizes objects using a collection of points in three dimensions on the computer.

Students will be introduced to the concepts of Engineering Design using 3D CAD Modeling and learn how to use this tool. No prior experience is required – key concepts will be explained and modelled for all students. Each class session, students will learn new modeling concepts and techniques to create increasingly complex and comprehensive parts and assemblies. Students will be given a theme and goal for each session, but will have the freedom to exercise their own creativity in choosing exactly what they would like to model that day. Students will also learn how to create professional documentation such as dimensioned multi-view drawings and exploded assembly drawings.

Course Goals and Learning Outcomes

• Learn the basic concepts and vocabulary associated with 3D CAD Modeling.
• Learn to use Autodesk Fusion 360 to model various commonly known items.
• Learn to create documentation for the parts and assemblies created.

Structure

This course is primarily a hands-on, exploratory class where students will use basic 3D CAD modeling skills to develop their own designs. Each day, students will be presented with basic instruction about various modeling techniques and the use of Fusion 360. Students will use their accumulated skills to build increasingly creative and complex designs, and all students will be encouraged to share things they learn with each other as they work. Students will present their best work with each other on the final Saturday to celebrate their accomplishments!

Topics to be covered during the Saturday workshops:

Module 1: - Introduction to 3D CAD Modeling, Portfolios, and creating basic component parts
Module 2: - Adding more complex patterns and features to our component parts
Module 3: - Using and creating professional Engineering drawings for our parts
Module 4: - Part Challenge #1
Module 5: - Creating assemblies of multiple component parts
Module 6: - More assemblies and creating simulation presentations
Module 7: - Creating exploded part assembly drawings
Module 8: - Part/Assembly Challenge #2
Module 9: - Introduction to more advanced part type modeling
Module 10: - Final Project 1 – Putting it all together
Module 11: - Final Project 2 -
Module 12: - Final Project 3, presentations and celebration!

Prerequisites:
- Must be a high school student in grade 10-12 (upcoming fall semester).
- Must be a current ABLE participant
- Access to a computer and an Autodesk Fusion 360 student account (free).

Instructor: Bob O'Neill [San Diego Computer Science Teachers Association]