My project is a reproduction of the SpaceX Dragon Capsule, a spacecraft built and used by a private company to take cargo to and from the International Space Station.

I chose to model the Dragon Capsule because as an aerospace engineer I am interested in all types of space flight. The Dragon capsule as of now has had six successful missions to the International Space Station. SpaceX in particular interests me because they are perhaps the most successful private space contractor in the world right now, and are leading the way in a brand new industry.
First, I started by making the cargo hold by sketching a circle and extruding it to make a solid cylinder. The flat faces on either side were made using the extrude cut feature, where I sketched a solid line on top of the cylinder and cut down. The pieces where the solar panels attach to the cargo hold were made by sketching the profile of one on the flat face and extruding in outward. The sketch from one face was then offset to appear on the other flat face and extruded as well. Finally, the part was hollowed out using a sketch on the top of the part and the extrude cut function. Additionally the “Dragon” logo was added using the “Decal” feature.

Next, I made the basic shape of the capsule itself by sketching the cross sectional profile of the part and revolving it about its center axis. The cut feature and hole on the top was created by creating a sketch and extrude cutting it downward. I used the loft tool to create the vertical and horizontal contours along the sides of the capsule. This was done by creating a small circle on a plane near the top of the part, and lofting in downward on a path toward the mid-section of the capsule. The horizontal loft was created by lofting a circle along another circular path around the capsule. Additionally, the features on the side of the capsule were created by extruding a sketch from a plane near the center of the capsule. A cut extrude was added on the side of these extrusions so that the faces of the features would run parallel to that of the capsule body. Additional chamfers were added to the capsule as needed and finally the “SpaceX” logo was added using the decal function.
The final part I made was the solar panel. I started with the cylindrical piece where the panel would connect to the cargo hold. This was created by extruding a circle. Then on a horizontal plane cutting through the center of the cylinder I sketched the top face of the panels themselves and extruded them downward. The additional pieces connecting the panels were created by offsetting several vertical planes. I sketched circles on each of the planes and extruded them to connect the panels.

The hardest feature to create was the contours on the sides of the capsule. This was done using the loft feature and was more tedious than anything else. I had to create the sketches on separate planes and connect them using the loft feature so that a small cylinder would be extruded along the side of the slanted face. An additional sketch had to be created to reference where the lower sketch should go in comparison to the upper sketch so that the features would appear to go straight down the side of the capsule. This process had to be completed 4 separate times with 8 separate sketches because SolidWorks would not allow me to loft all the features at once.
The SolidWorks portion of this class taught me how to use the SolidWorks program and create a number of different complex features in several different ways. I was also able to improve my drawing dimensioning skills when creating drawing sheets for my parts. Additionally, because I used a similar program through high school, using SolidWorks this year has taught me how to transfer skills learned in one 3D modeling program to another. SolidWorks also helped me visualize several different drawing techniques from the graphics portion of the course such as cross section views.

Pictures:


http://www.spacex.com/media-gallery/detail/118081/4056