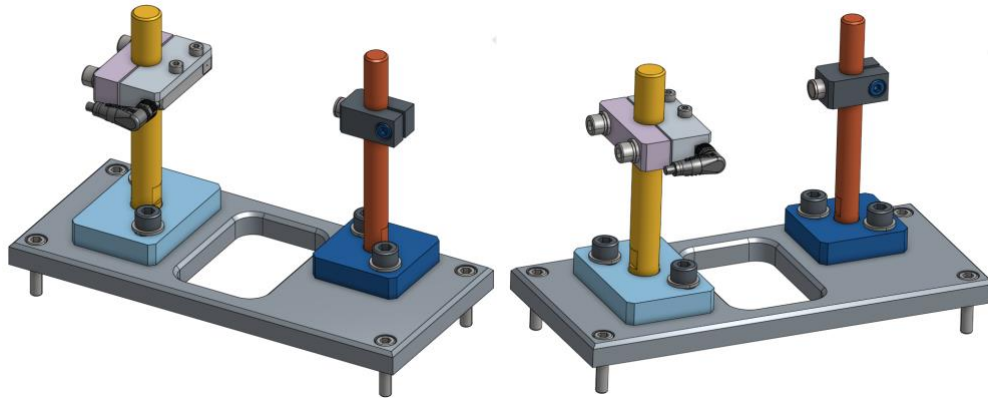# MECH 311: M4 Sensor Mounting Modeling Assignment

80 points, 10 points per model

This is an individual assignment. You must do all work while signed into your personal Onshape account.

This assignment is an exercise in bottom-up design, where each part is designed independently in its own model space and then an assembly is created from the completed parts. For this assignment, you will create all of the non-provided part models necessary to complete the Sensor Mounting Assembly per the provided PDF and Onshape documents (eight parts total). Assembly of the part models will be done as a separate assignment at a later date.

The instructor has shared an Onshape document for this assignment with you. It can be found in the "Shared with me" area on your Onshape Documents page. This assembly might be used on a piece of industrial equipment to hold a photo-electric sensor and reflector in alignment with each other. The mounting plate could be directly mounted to an assembly line or other machine (as is or redesigned) or the sensor and reflector assemblies could be removed from the plate and used on their own.

Complete each of the following tasks to complete this assignment:

1. Make a private copy of the **M4 & M12 Sensor Mounting Student** Onshape document that was shared with you by the instructor. (You may remove yourself from sharing the original document after you have made a private copy if you would like.)

2. Rename the document using the following format: "**FerrisID M4 & M12 Sensor Mounting Assignment**" where FerrisID is your short username, i.e. Mr. Brady would rename his document as "bradyb M4 & M12 Sensor Mounting Assignment" (do not include quotes).

3. Create new Part Studio tabs for each of the required part models (see the assembly drawing parts list). Rename each tab to match the item number and name of the part that is modelled in that tab per the provided assembly drawing with parts list, i.e. "1 Mounting Plate."

4. Create a part model of each part within its specific Part Studio. Make each part model in accordance with the following guidelines:

   a. Rename the part model in the tree to match the Part Studio tab name without the detail number (after the part model is created).

   b. Orient each part relative to the Part Studio reference planes to match the views in the provided drawings.

   c. Locate each part model such that a specific geometry feature is located at the origin (described below for each part).

   d. Match the design intent given the part drawings for each part model. When in doubt, ask the instructor for clarification. Read the part specific instructions provided on each drawing sheet.

   e. Change the color of each part model such that all parts have a different color. (This will make it easier to see each part when you get to the assembly process.)

5. Click on the "Manage versions and history" icon near the top left corner of the Onshape interface with you document open. Click on the "Create version" button, name the version "Grade Me" and leave a note in the description if you would like, then click on the "Create" button.

6. Click on the "Share" button near the top right part of the interface and add brianbrady@ferris.edu in the individual box, set the sharing access to "Can Edit" from the pull-down list and make sure "Comment" is checked, and then click on the "Share" button to complete the task. **This step must be completed before 11:59pm on the assigned due date in order to receive full credit. Only the work done prior to the creation of the "Grade Me" version will be graded.**

Required Parts; origin descriptions are based on the individual part drawing orientations, not the assembly orientation:

① Mounting Plate: origin on the front face at the left, bottom corner

② Sensor Base: origin at the front face at the center of the 15mm diameter counterbore

③ Sensor Shaft: origin at bottom, center of the hole

④ Sensor Clamp 1: origin at bottom and centered on 15mm diameter arc

⑤ Sensor Clamp 2: origin at bottom and centered on 15mm diameter arc

⑥ Reflector Base: origin at the front face at the center 12mm diameter counterbore

⑦ Reflector Shaft: origin at bottom, center of the hole

⑧ Reflector Clamp: origin at mid-plane, centered on the 12mm hole

Revised: 08/01/2019 bdb