

**AGENDA / HORAIRE:**

9:00am – 9:30am	Orientation / Séance d'information
9:30am – 12:00pm	Competition / Compétition
12:00pm – 1:00 pm	Lunch
1:00pm – 3:00pm	Competition / Compétition

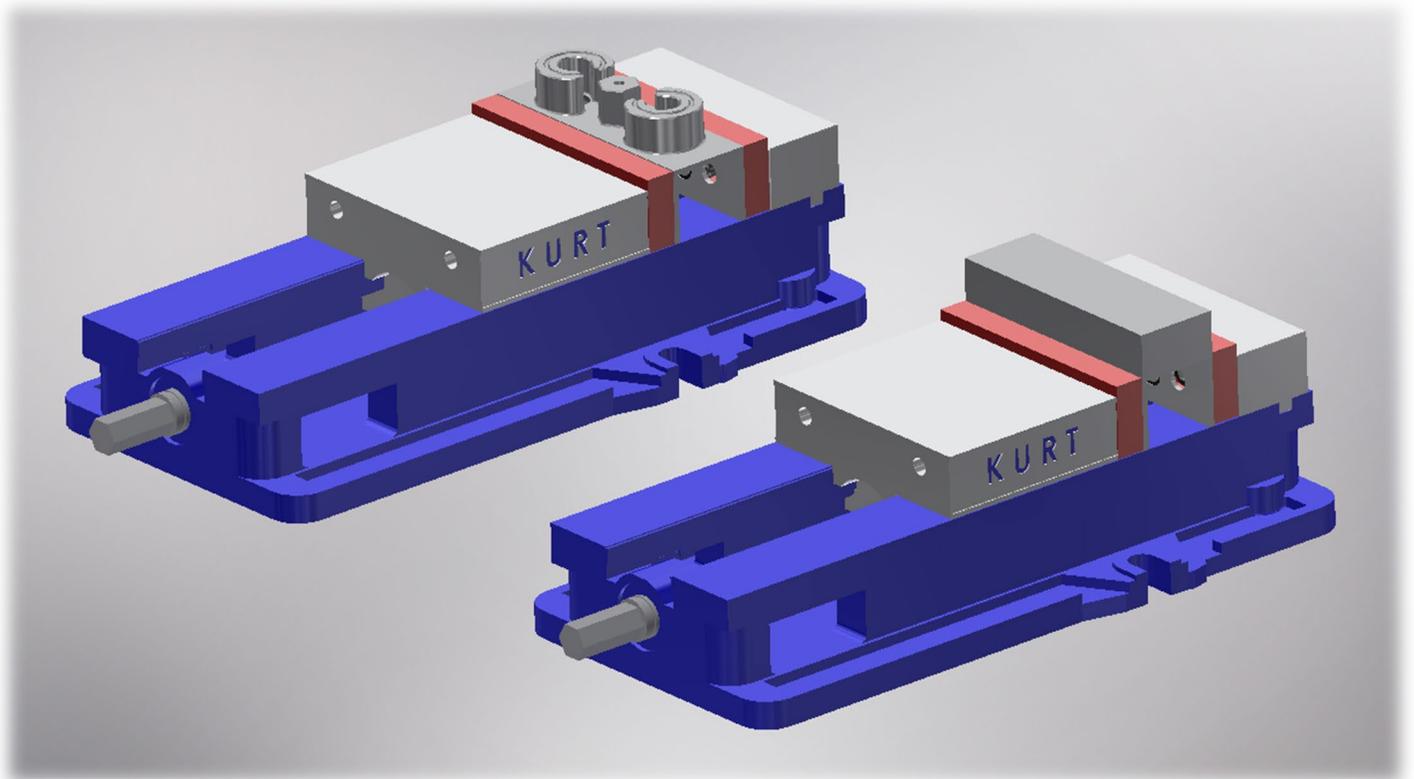
**PM Task: 2 hours**

## Part Design and Layout

You work for an organization that provides mechanical design and product development services. A customer has requested your services to help develop a CNC machine tending robot cell like the image shown below. The company is pleased with the work you completed on the Base and assembly tasks and would now like your assistance developing a custom robot gripper jaws for loading and unloading the stock and machined workpiece from a set of vices. The customer has provided a STEP file of their preferred robot gripper base, machined part and raw stock model for you to work with.

The customer has requested the following accommodations for the robot gripper jaw design:

- The robot gripper jaws will be 3D printed using the FDM method and your design must accommodate that
- The left and right robot gripper jaws must be identical/standardized parts – one part file will work for both sides
- The jaws must be able to accommodate the stock and machined parts independently without being removed from the robot; however, only one part will be gripped at a time
- Each jaw must contact full surfaces or at least three points simultaneously for both stock and machined part gripping
- At least 0.125 inches from the bottom of the part must be untouched by the gripper to allow for mounting in the vice as shown below
- Each robot gripper must mount using the two M3x.5 threaded holes shown below





## Deliverables:

**Each file must be saved with the following naming format: Initials PS or S PM**

**Example: JBPSPM**

1. Create a parametric model of the robot gripper jaw that conforms to the customer request mentioned above
2. Create a fully functional parametric assembly of the supplied Robot Gripper and your robot gripper jaw using all of the provided Robot Gripper STEP files. The assembly must be able to open and close the gripper with the jaws mounted. Add your own M3x.5 fasteners to secure your gripper jaw to the gripper base.

3. Complete a detailed drawing package as shown that aligns with the View and Annotation Guide and as follows:

Page 1: An isometric view and orthographic views along with the annotations described for your gripper jaw design

Page 2: Three views of the full assembly, machined and stock part as described

*The drawing package MUST be exported as one PDF and submitted in PDF format. Please ensure the drawings are prepared in millimetres.*

4. Capture one visually appealing screenshot or rendering of two fully assembled robot grippers – one gripping the machined part and one gripping the raw stock. Use reflections, shadows and perspective viewing. Please submit the file as a .jpg file with a resolution of 1834x1074. Both grippers mentioned will be shown on the same image.

5. Export your fully assembled gripper file containing all models as a .STEP File and submit for review

### Post-secondary Only:

6. Create the following video animation and submit as either a .mp4 or mpeg video. Select a view/views that best show how the parts interact with the gripper jaws when gripping and release is happening.

0-3 seconds: The full robot gripper begins in the closed position and moves to the open position

3-5 seconds: The stock part appears between the gripper jaws

5-8 seconds: The gripper closes on the stock part

8-10 seconds: The grippers open and the stock part disappears

10-12 seconds: The Machined part appears between the gripper jaws

12-15 seconds: The gripper closes on the Machined part

### Evaluation:

A total of 50 points are achievable during the AM challenge. The following detail provides an overview of where the points will be awarded.

#### Secondary Marking

Deliverables 1/2/3 (Functionality, View and Details): 30 Points

Deliverables 2/3 (Assembly Views): 10 Points

Deliverables 2/4 (Assembly Rendering/Screenshot) 5 Points

Deliverable 5 (Exported STEP): 5 Points

#### Post-Secondary Marking

Deliverables 1/3/6 (Base Features and Annotations): 25 Points

Deliverables 2/3 (Assembly Views): 10 Points

Deliverables 2/4 (Assembly Rendering/Screenshot) 5 Points

Deliverables 5 (Exported STEP): 3 Points

Deliverable 6 (Animation): 7 Points