

ME3820 5-Axis Machining Lab

You are going to be working on the same part that you already machined using a simultaneous three-axis operation. However, for this lab you are going to machine it as a 5-axis operation. The required deliverables are listed below. To learn how to complete these items, please see the WPI HTEC page on YouTube and watch the 5-axis instruction videos (links to these videos will be presented below). As an additional reference, you may also refer to the [5-Axis Machining at WPI](#) document. (If the link breaks, it's located on the manufacturing labs sharepoint site under reference materials.) Please note that this document was written for ESPRIT 2013 and the 5-axis cycles have changed since then so the programming instructions in this document will not be complete for your use. The machine operation instruction, however, are still accurate.

The required deliverables are:

1. Create the 5-axis Esprit program
 - a. Create a new machine setup that matches the VM2/T5C combo
 - b. Save the machine setup out of the .esp file
 - i. To do so, right click in the gray area of the machine set-up window and select save
 - c. Create your own 5-axis machining template
 - i. Do so after creating the machine setup and before adding the part and operations to the .esp file. To save the file as a template, go File→save as and change the file type to .est. Be sure to create a new file from that template before continuing
 - d. Using your choice of two and a half axis milling operations, machine one of the angled faces of the part. You may use your choice of standard tooling (no facemills). The tool's axis must be either perpendicular or parallel to the face during the operation. Hint: to tell ESPRIT how to orient the tool, you're going to have to employ workplanes.
 - e. Use the Swarf operation to machine one of the adjoining faces. (This is a 5-axis operations and can be found under SolidMill Mold 5-axis.)
 - f. Use your choice of the 5-axis operations to machine both of the remaining angled faces. Use a finishing operation. (The faces should share an edge. If they don't, move one of your other operations.) The tool's axis must stay either parallel or perpendicular to the face while cutting. Please use only the two Table-Table external links and the Feed bridge transition. Hint: don't bother trying to use one of the specialty 5-axis cycles (Impeller, channel, blade or port) and you probably can't do it with either of the swarf cycles.
2. Machine the part
 - a. The rotary will already be connected and operational. You will not have to set up the additional axis.
 - b. The A and B work offsets will already be set.
 - c. You will have to set the Z component of the axis point of the tilt axis in ESPRIT.

- d. Do all the things you would normally do to run a program. Follow the five safety steps.
 - e. Show your final part to a TA.
3. Lab Report
- a. You will need to write a lab report to document what you did in this lab.
 - b. Follow the lab report template when writing the report.
 - c. Please include a table of your tools, feeds, speeds, stepovers, incremental depths and total depths. There should be an entry in the table for each operation.
 - d. In the report, compare the part you made in the 3 axis lab to the part you made in this lab.
 - e. In the report, compare the different operations you used to machine the beveled sides of the part.