

Exercise 2: 3D-CAD Design

This exercise consists of four 3D modeling tasks, each with increasing complexity and demands on transfer knowledge. Creative problem-solving and precision are required to achieve the required shapes and features. For all tasks, please strictly follow the parameters and constraints. We will accept a small margin of error in the parameters for Tasks 3 and 4, but not for Tasks 1 and 2. Make sure they are fully defined and not ambiguous (blue: underdefined, black: fully defined).

You will find technical drawings with the dimensions appended to this exercise!

Exercise Description:

1. Perforated Cylinder (2 points):

Reproduce the cylinder example shown during the lecture. This cylinder should have three holes cut out from its surface. Ensure that the holes are uniformly distributed as specified in the technical drawing.

2. Hollowed Cylinder with Tangential Plane Cut (4 points):

This task requires you to understand and apply the concept of tangential planes and complex cuts. Create a hollow cylinder and use tangent planes to partially remove parts of it. Strictly follow the dimensions provided in the technical drawing.

3. Measure and Replicate (5 points):

Measure the 3D-printed model provided and record all dimensions you deem necessary in the form of a hand-drawn sketch. The printed model will be available to you during the next three lectures. Use the recorded measurements to replicate the model in Fusion 360. Due to inevitable inaccuracies introduced by measurement, a small margin of error (up to ± 0.5 mm) is allowed. However, it is essential to aim for precision and accuracy.

4. Sheet Metal Elephant (4 points):

A complex object that requires you to use the Metal Sheet Bend Tool, which allows for precise control over bending operations in sheet metal design. This task requires you to model intricately using continuous surfaces as per the technical drawing. A small margin of error (up to ± 0.2 mm) is allowed due to the complexity of this task, but you should aim to be as accurate as possible.

Deliverables:

Deadline: Tuesday, 26.11.2024, 23:59h

Individual submission of a *.zip archive named "[family name]_exercise2.zip" to TUWEL, containing the following files:

- Photo of your hand-drawn sketch with dimensions for task 3.
- *.f3d files for all 4 tasks (exported from Autodesk Fusion 360), named task1, task2, etc.
- Rendered images (.png or .jpg) for each task, named accordingly (e.g., task1.png, task2.jpg).
- A *.pdf document providing brief descriptions (1-2 sentences per design step) of the timelines for all tasks (timeline = bottom line in Autodesk Fusion 360).