

## **EML 2023: Computer Aided Graphics and Design**

### **Final Project**

Design a pencil sharpener that is manually operated and collects all pencil shavings debris in a built-in container. It could be operated by a hand crank or some other similar mechanism. Due to cost constraints, the device should not use electrical or other types of powered actuators and it should be designed for ease of operation. The device should consist of an assembly of components. Create solid models for all the individual components and construct an assembly model. For the final report you should generate drawings for individual components as well as assembly drawings showing sectional and exploded views as well as a bill of materials. The report should also have sections describing your design including how the components are assembled.

Ease of assembly and operation is an important consideration. You need to come up with a design objective such as a wall mounted pencil sharpener for classroom or table mounted for home / office and decide what type of customer your product is meant for. To ensure that the product sells it has to look appealing / stylish / original etc. A light weight, low cost product is desirable therefore minimizing the volume of each part is an objective but obviously it has to be sufficiently sturdy (No calculations are needed. Just use your intuition to decide wall thicknesses etc.). Assign tolerances for components where the fit between the components is critical to the functioning of the product.

This project is designed to give students an opportunity to carry out a design from the original concept through the detailed design using CAD software. For the final design, solid models of all parts must be created and used to build an assembly model. Working drawings must be generated that shows the assembly and all the parts. Sectional views, auxiliary views, detailed views, and exploded views must be used where needed to explain the design.

Submit a project report that includes:

- (i) Project Description: This section should be 1-2 pages long and contain:
  - a. Objectives of the design
  - b. Concept selection: How and why you selected this particular concept?
  - c. Functionality: A few paragraphs that describes a step by step assembly procedure (referring to the drawings) and how the device works.
  - d. Conclusion: Advantages and disadvantages of your design. (Considerations: cost, safety, functionality, durability)
- (ii) Working Drawings: All drawings must be in a single drawing file (\*.SLDDRW) with multiple sheets that show part and assembly drawings.

- a. Assembly drawings should include orthographic, sectional and exploded views that shows the entire assembly with part numbers and a bill of materials.
- b. Drawings for each component you have designed should have orthographic views and an isometric view and where needed sectional views, auxiliary views and detail views. Show all dimensions and include appropriate notes such as material, tolerances etc.

NOTE: Submit the report and all the part files, assembly files and drawings files associated with the project in a single compressed file (\*.zip).

Project Description: (20%)	
a. Objectives of the design	2%
b. Concept selection: How and why you selected this particular concept?	5%
c. Functionality: A few paragraphs that describes a step by step assembly procedure (referring to the drawings) and how the device works.	10%
d. Conclusion: Advantages and disadvantages of your design. (Considerations: cost, safety, functionality, durability)	3%
Working Drawings: (30%)	
a. Assembly drawing that shows the entire assembly with part numbers and a bill of materials. Include a sectional view and an exploded drawing.	15%
b. Drawings for each principal component showing orthographic views and an isometric view and where needed sectional views, auxiliary views and detail views. Show all dimensions and include appropriate notes such as material, tolerances etc.	15%
Solid and Assembly models	30%
Functionality	10%
Originality and Aesthetics	10%