EML2322L – MAE Design and Manufacturing Laboratory

Final Design Checklist

Group Number: _____ **TA Performing Evaluation: _____**

Evaluation Grade: _____ (up to 40% of DR3 1st Submission Grade)

MOBILE PLATFORM DESIGN.

- ☐ YES ☐ NO Is there an accurate subassembly model for mobile platform, including frame, attachment brackets, motors and mounts, wheel hubs, wheels, control box, and associated fasteners?
- ☐ YES ☐ NO Is the simplified 80/20 part model used to speed up rendering and improve print quality?
- ☐ YES ☐ NO Are motor mounts and wheel hubs designed using the provided design guides? (Please don't ask for feedback if you didn't read our provided resources.)
- ☐ YES ☐ NO Are material choice, geometry, attachment method, torque transmission method (if applicable), and general design justified for each relevant component?
- ☐ YES ☐ NO Does each component model have a concise and meaningful name?
- ☐ YES ☐ NO Are appropriate mates employed so each component is fully constrained?
- ☐ YES ☐ NO Was the final assembly model used to check clearances and identify interferences? (These types of problems are MUCH more difficult to fix in the prototyping phase of the project.)
- ☐ YES ☐ NO Is design feasible and realizable with lab resources? Ask questions before submitting a design you aren't sure can be made within the allotted time frame (or at all).

REMAINING SUBSYSTEMS DESIGN. (Not all items apply to all subsystems.)

- ☐ YES ☐ NO Is there an accurate subassembly model, including all components (custom and OTS), attachment brackets, and fasteners?
- ☐ YES ☐ NO Are material choice, geometry, attachment method, torque transmission method (if applicable) and general design justified for each relevant component?
- ☐ YES ☐ NO Is each component adequately constrained against unintended degrees of freedom? (i.e. is each stationary part rigidly attached in a proper manner?)
- ☐ YES ☐ NO Does each component model have a concise and meaningful name?
- ☐ YES ☐ NO Are appropriate mates employed so each component is fully constrained?
- ☐ YES ☐ NO Are saved configurations created for all moving components? (lifting arms, ball gates, etc.)
- ☐ YES ☐ NO Was the final assembly model used to check clearances and identify interferences? (These types of problems are MUCH more difficult to fix in the prototyping phase of the project.)
- ☐ YES ☐ NO Is design feasible and realizable with lab resources? Ask questions before submitting a design you aren't sure can be made within the allotted time frame (or at all).

FASTENERS AND THREADS.

- ☐ YES ☐ NO Are all fasteners included in the assembly model?
- ☐ YES ☐ NO Are included fasteners appropriate in size and accurate in scale? (Download appropriate CAD models from Mcmaster-Carr or other sources, and rename in a meaningful manner)
- ☐ YES ☐ NO Are threaded holes designed with AT LEAST FIVE threads of engagement?
- ☐ YES ☐ NO Do fastener head types allow for adequate motion with required assembly tools? (i.e. screwdrivers, allen wrenches, sockets and ratchets, rivet guns, etc.)
- ☐ YES ☐ NO When possible are thru bolted holes used instead of threaded holes to reduce mfg. time?
- ☐ YES ☐ NO Are selected fasteners routinely stocked in lab? (Smaller fasteners can be ordered by submitting a purchase order form, but doing so creates more work for your team.)
- ☐ YES ☐ NO Do motor mounting brackets use all of the provided motor mounting holes? (The Globe motor is the only exception)

SHEETMETAL PARTS.

- □ YES □ NO Is part modeled using SolidWorks sheetmetal tools?
- □ YES □ NO Is thickness appropriate for application? (Too thick is hard to bend; too thin is flimsy.)
- □ YES □ NO Is part designed for manufacturing according to the Sheetmetal Design Guide? (Complex parts need to be split into multiple simpler parts, integrated weld tabs, etc.)
- □ YES □ NO If a part is to be welded, is it specified as steel? (Aluminum is much harder to weld.)

REMAINING DESIGN FOR MANUFACTURING (DFM) TIPS.

- □ YES □ NO Is each part as small as possible without affecting intended function?
- □ YES □ NO Have alternative designs been investigated which may lower manufacturing and assembly times? (e.g. designs which combine or split parts; or designs which use sheetmetal versus billet?)
- □ YES □ NO Have unnecessary features that increase mfg. time been eliminated? (fillets, etc.)
- □ YES □ NO Are similar parts designed to be identical instead of mirror images? (e.g. motor mounts)
- □ YES □ NO Is each part feature designed around nominal (commonly produced) cutter sizes?

GENERAL POINTS.

- □ YES □ NO Does final design meet all design objectives? (i.e. size, storage in box, team number, etc.)
- □ YES □ NO Has each design concept been tested using some type of meaningful prototype? (It's risky to place your hopes in a completely untested design concept.)
- □ YES □ NO Is final design proven capable of entering the arena by importing the ramp model provided in the Project Description into the final assembly?
- □ YES □ NO Is design feasible and realizable with lab resources? Ask questions before submitting a design you aren't sure can be made or made within the allotted time frame.

COMMENTS.