

Lab 3 – Simple Assemblies and Gear Design

Assignment Instructions:

The final assembly must be fully constrained (i.e., no degrees of freedom remaining)

- Design a gearing mechanism as outlined in **your assigned version**
- Model your mechanism assembly in Autodesk Inventor using the **given *.IPT files** (refer Avenue > Content > Lab Material > Lab 3)
 - All gears must be designed with a hole the same diameter as the given short spur gear rod (GIVEN - ShortRod.ipt)
 - Spur gears **G1**, **G2** and **G3** must be mounted and fully constrained to a short spur gear rod, and each rod must be mounted and fully constrained to the spur gear mounting plate (GIVEN - SpurGearMount.ipt)
 - **G1** must align with the given hole in the spur gear mounting plate (modify mounting plate to add additional holes)
 - The centre of each additional hole must be the same height relative to BOTTOM of mounting plate as the given hole
 - One end of each rod must be flush with the face of the BACK of the spur gear mounting plate
 - All spur gears must be mounted (via rods) to the spur gear mounting plate on the side labelled “FRONT”
 - Space spur gears such that there is a **12.5-mm** gap between the gears and an adjacent face (whether it be the mounting plate or another spur gear on the same rod)
 - The face of meshing gears must be flush with each other
 - NONE OF THE GEARS should extend beyond the boundary of mounting plate (when viewed from FRONT)
 - Do not worry about tooth overlap for this assignment
 - **W1** and **G4** must be mounted and fully constrained to the same rod (GIVEN – LongRod.ipt)
 - This rod must be mounted and fully constrained at one end to the spur gear mounting plate and at the other end to the vertical segment of the worm drive mounting plate (GIVEN – WormGearMount.ipt)
 - This rod must be flush with the EXTERIOR FACE of the worm drive mounting plate
 - One end of **W1** must be mated with the INTERIOR FACE of the worm drive mounting plate
 - **WG1** must be mounted fully constrained to a short rod (GIVEN – ShortRod.ipt)
 - This rod must be mounted and fully constrained to the horizontal segment of the worm drive mounting plate
 - The centre of this rod must be located 50-mm from INTERIOR FACE of mounting plate
 - One end of the rod must be flush with BOTTOM of mounting plate; the other end must be flush with the face of **WG1**
- Submit the following:
 - A completed assembly of the mechanism, submitted to your Lab Section folder on the Avenue Dropbox:
 - A completed Google Form of all your gear parameters, submitted online using the given URL