

Weekly Design Evaluation Name _____
- Spur Gear Design Project - Class Design Section (Partial) - 40 Points

Instructions for modeling a pair of spur gears in SolidWorks 2016.

This assignment utilizes typical spur gear parameters, formulas and sketching methods to design a simple involute spur gear pair for use in an assembly.

Requirements:

- Precision to 4 significant digits
- Material: a metal of your choice
- To understand the terminology and methods of gear design read and understand the information provided through the links on the Student Resources Page of your website and through other relevant resources.

Formulas needed for this assignment:

Gear Ratio	Gr	$Gr=N2/N1$	Given	Divide the teeth on the Gear Wheel by the teeth on the Pinion Gear
Diametral Pitch	Pd	$Pd=Nx/Dp$	Given	Ratio of the number of teeth per arc inch of Pitch Diameter (a common value between both gears)
Teeth, Pinion Gear	N1	$N1=Dp1/Pd$	Given	
Teeth, Gear Wheel	N2	$N2=Dp2/Pd$	Determine	<u>Use Gear Ratio</u> for this assignment
Outside Diameter	Do	$Dox=(Nx+2)/Pd$	Determine	Maximum extent of gear tooth
Pitch Diameter	Dp	$Dpx=Nx/Pd$	Determine	Imaginary circle approximately in the center of the teeth, both gear pitch diameters will contact each other tangentially
Root Diameter	Dr	$Drx=(Nx-2)/Pd$	Determine	Maximum extent of tooth cut
Pitch Point Diameter	Dpp	$Dppx=1/4*Dpx$	Determine	Used to model the involute edge on the top portion of each tooth
Base Diameter	Db	$(Dbx=Dpx \cos \emptyset)$	Use sketch geometry	One of two elements that defines a Pitch Point which is the center of a Pitch Point Diameter circle
Angular Circular Pitch	Ta	$Tax=(360/Nx)$	Determine	Angular distance on the Pitch Diameter between one tooth and the same geometric reference on the next tooth in degrees
Quarter Angular Circular Pitch	Ta4	$Ta4x=Tax/4$	Determine	Quarter of the Angular Circular Pitch which is half the width of a tooth. Used for mirroring partial tooth sketch profiles.
Center to Center Distance	Xc	$Xc=(Dp1+Dp2)/2$	Determine	Distance between centers of both meshed gears used for the mounting plate part in the assembly.

Notes: The x in the notations above, such as Nx or Dpx refer to either the Pinion Gear (1) or the Gear Wheel (2). For example in the equation for Pitch Diameter $Dpx = Nx/Pd$, if you are determining the Pitch Diameter for the Gear Wheel then the formula will be $Dp2 = N2/Pd$