ENGR 335

KEY WORDS AND STUDY QUESTIONS FOR CH 10

laminar pipe flow
Hagen-Poiseuille flow

Reynolds number
equivalent sand roughness

friction factor
Darcy-Weisbach equation

Moody diagram
Colebrook correlation
Haaland correlation
Nikuradse correlation

area average velocity
volume flow rate
discharge

turbulent pipe flow
turbulence models
viscous sublayer
logarithmic layer
power-law model

relative roughness
hydraulically smooth regime
transition roughness regime
completely rough regime

positive displacement pump
dynamic pump
centrifugal pump
piston pump
gear pump

loss coefficient
minor losses

pump curve
stall point
free flow point
system curve

entrance effects
entrance length

node

1.	Does the area average velocity change in the entrance region of a pipe? Why or why not?

2.	What conservation principle is used to obtain the shear stress distribution in laminar pipe flow. Why are the terms on the right hand side of the conservation equation equal to zero?

3.	Describe a piping system where it is a good approximation to neglect fitting and transition losses.

4.	Give the two h_L that can be calculated from conservation principles. How are all the other h_L obtained?

5.	A pump curve gives the head produced by a pump as a function of _____. How is a pump curve obtained?

6.	How can we predict if a pipe flow will be laminar or turbulent?