Lecture 12 Notes
Chapter 11:

Goals for today - Lecture 12
1. What is a pump and its applications
2. Discussion of different types of pumps and their characteristics
3. Best Efficient Operating point (BEP) for pumps

Sec 11.1
Pumps:
   1) Positive Displacement Pump (PDP)- pushes the liquid by compressing it against a cavity, with an opening suddenly becoming available.
   2) Rotodynamic Pump(RP): Pushes the fluid by adding momentum to it by means of a fast moving blade
PDP advantage:
   - works with any liquid (viscos or not, Newtonian or not)
   - has constant (almost) flow for any system head
PDP disadvantage:
   - usually low Q
   - pulsating/unsteady flow (unless a settlement tank is used)
RD advantage:
   - steady flow
   - high flow rates compared to PDP
   - variable flow depending on the system head
RD diasvantages:
   - Needs "priming" unlike PDP. Priming means that the pump needs to be filled with liquid to start, i,e, to suck liquid
   - Moderate pressure
   - High viscous liquids (or shear thickening) will degrade the pump performance, significantly.

Types of Pump Video:
https://www.youtube.com/watch?v=wsm5zzsBI4s&ab_channel=LearningEngineering

Video for working Centrifugal Pump:
https://www.youtube.com/watch?v=BaEHVpKc

Good video to watch to understand how different pumps work!
https://www.youtube.com/watch?v=1huJZ1XChYE&ab_channel=PipingAnalysis

See Figs. 11.1-11.3 & 11.6 & 11.7 & 11.3

Fig 11.6 7 11.7:
   - Pump curves are strictly for a given fluid
   - At low $Q \rightarrow H_p \approx$ Const. (but pump is inefficient)
   - Max η is at $\sim 0.6 Q_{max}$
   - Max η point is called BEP (Best Efficiency point) and one should aim for running the pump at BED.