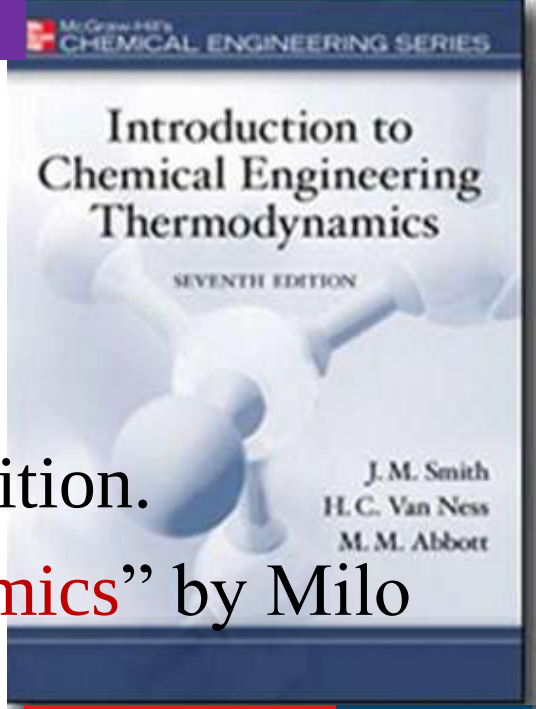
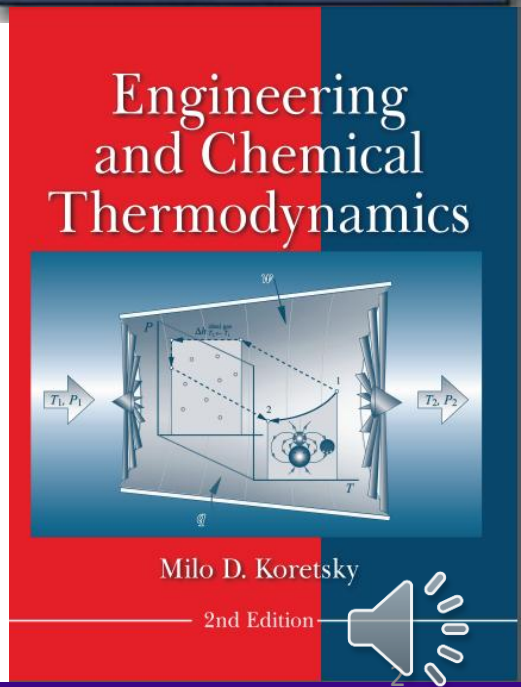
Recommended Books

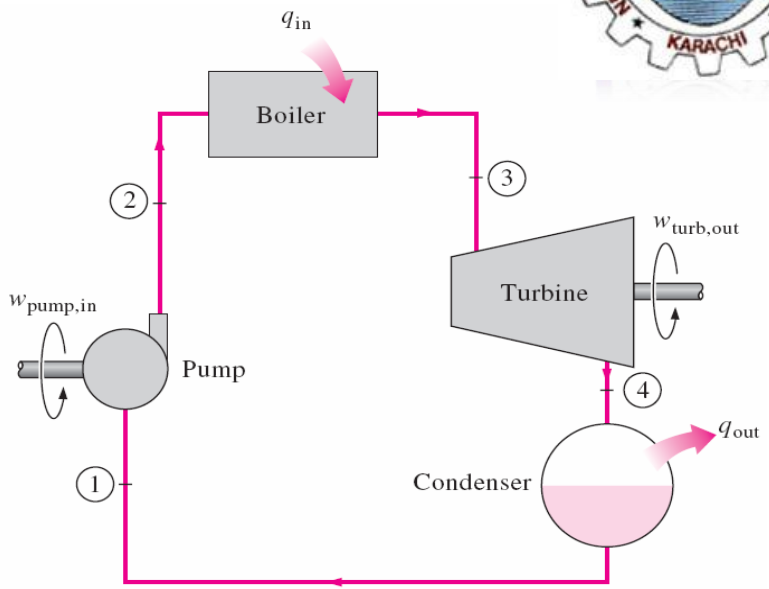
- "Introduction to Chemical Engineering Thermodynamics" by J.M Smith, 7th Edition.
- "Engineering & Chemical Thermodynamics" by Milo D Koretsky, 2nd Edition.
- "Thermodynamics, an Engineering Approch" by Yunus A Cengel. 7th Edition.





What is Thermodynamics?

- The science of energy, that concerned with the ways in which energy is stored within a body.



- Thermodynamcis derived from the greek words "therme" means heat and "dynamics" means power.

- Thermodynamics applies to a wide variety of topics in science and engineering, especially physical chemistry, chemical engineering and mechanical engineering, but also in fields as complex as meteorology.

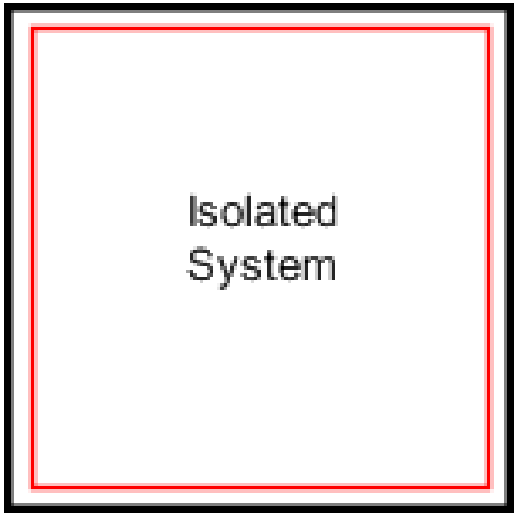
Equilibrium Thermodynamics

- The term 'thermodynamic equilibrium' indicates a state of balance, in which all macroscopic flows are zero.

- In an equilibrium state there are no unbalanced potentials, or driving forces, between macroscopically distinct parts of the system.

- A central aim in equilibrium thermodynamics is: given a system in a well-defined initial equilibrium state, and given its surroundings, and given its constitutive walls, to calculate what will be the final equilibrium state of the system after a specified thermodynamic operation has changed its walls or surroundings.

Type of system (isolated system)



- Isolated system – neither mass nor energy can cross the selected boundary

- Example
  - ✓ coffee in a closed, well-insulated thermos bottle.
  - ✓ Universe.

State, Equilibrium and Process

Adiabatic process: A process during which no heat is flow in and out of the system. For such a process $\Delta Q = 0$