

ENGRD 221: ENGINEERING THERMODYNAMICS

Lecture 11: September 27, 2007

Reading Assignments (from Moran & Shapiro, Sixth Edition): Read all of Chapter 6 including the solved example problems.

Topics covered:

- Entropy change for an irreversible process
- The 2nd law of thermodynamics revisited: The 2nd law for an isolated system, the 2nd law applied to the universe.
- Combining the 1st and 2nd laws for reversible infinitesimal processes, $Tds - Pdv = du$ and $Tds = dh - vdP$
- The use of equations $Tds - Pdv = du$ and $Tds = dh - vdP$ in irreversible processes
- Entropy changes for an ideal gas with constant specific heat
- $T - v$, $T - P$ and $P - v$ expressions for isentropic processes (and constant c_v and c_p).
- Retrieving entropy data from Tables
- Entropy change for ideal gas with non-constant specific heats
- Specific entropy at temperature T and pressure 1 atm ($s^o(T)$)
- Isentropic processes, relative pressure and volume for air
- The 2nd law applied to a control volume
- Control volumes at steady state – balance of mass, energy and entropy rate
- Entropy data for water and refrigerants
- The $T - s$ and $h - S$ diagrams