

Class: SECOND YEAR	Semester: First		
Subject: Fundamentals of Thermodynamics	Units: 3	Thr.: 2	Lab: 2

Part	Subjects
1	Math Review
2	Definitions Systems, equilibrium, types of energy, state variables, extensive versus, intensive variables, transformations, reversible and irreversible processes.
3	The First Law of Thermodynamics The laws of thermodynamics, the first law of thermodynamics, p-v work.
4	Enthalpy, Specific Heat, and Ideal Gases Enthalpy, the importance of enthalpy, heat capacities and specific heats, relation between c_v and c_p , ideal gases, form of ideal gas law most used by meteorologists, internal energy of an ideal gas, specific heats for ideal gases, the first law of thermodynamics for ideal gases.
5	Thermodynamic Processes Isothermal processes, isobaric processes, adiabatic processes potential temperature, work in an adiabatic process.
6	Vertical Structure Geopotential, pressure, pressure decrease in an isothermal atmosphere, thickness and the hypsometric equation, distribution of molecular speeds, why is there so little hydrogen in the atmosphere? is the upper atmosphere well mixed?
7	Stability of Dry air Dry adiabatic lapse rate, buoyancy, stability in a dry atmosphere, potential temperature, dry static energy.

Textbook:

Anastasios Tsonis, 2007: An Introduction to Atmospheric Thermodynamics 2nd Edition. Cambridge University Press, 198 p.

Complementary Texts:

- Gerald R. North and Tatiana L. Erukhimova, 2009: Atmospheric Thermodynamics: Elementary Physics and Chemistry. Cambridge University Press, 280 p.
- Judith A. Curry and Peter J. Webster, 1999: Thermodynamics of Atmospheres and Oceans. Academic Press, 471 p.