

Course Number: 28035

Course Name: Statistical Thermodynamics

Course Type: Theory
Prerequisite: Advanced Thermodynamics
Level: Graduate
Group: Energy Conversion

Type & Max Unit: Constant 3
Corequisite: -
First Presentation: 2017-1
Last Edition: 2017-1

Objectives:

- The main goal of this course is to present the basic definitions and principles of statistical thermodynamics. In this regard Heisenberg principle and characteristics of wave equation will be discussed. It covers general aspects of statistical thermodynamics of particles, Maxwell Boltzmann distribution, Bose Einstein distribution, Fermi Dirac distribution, equation of state and different potential functions.

Topics:

- Introduction to probability and statistic
- Maxwell equations, atomic theory, Heisenberg principle and characteristics of wave equation
- Harmonic model for vibration energy and rotating
- Simple model of two atomic molecules and general model, calculation of function which interferes transformation
- Vibration, rotating and electrical energy of particles, Einstein and Debye model for solid material, internal energy of multi atomic particles, specifying equilibrium constants and existed component in chemical reaction in state of equilibrium of multi and coincident reactions
 - General aspects of statistical thermodynamics of particles, Maxwell Boltzmann distribution, Bose Einstein distribution, Fermi Dirac distribution
 - Dependency in system of functions, Grand Canonical Model in dependant systems related to internal energy of dependent particles
- Equation of state, virial equation of state and specifying virial constants, potential functions, specifying virial constants for multi gas mixture, fluidized gas.

References:

- 1- Norman M. Laurendeau, Statistical Thermodynamics, Cambridge University Press, 2005
- 2- Donald A. McQuarrie, Statistical Mechanics, University Science Books, 2000.
- 3- Terrell L. Hill, An Introduction to Statistical Thermodynamics, Dover Publications, 1987.
- 4- D. Chandler, Introduction to Modern Statistical Mechanics, Oxford University Press, 1987
- 5- J.E. Lay, Statistical Mechanics and Thermodynamics of Matter, Harper & Row Publisher, 1990