

Welcome to THERMODYNAMICS MSE 345

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Office hours: W-F: 4-5pm in Mines 145

Objectives of the course

The purpose of thermodynamics is to characterize and quantify energy transfers between physical systems and to predict the direction of the resulting physical processes. The goal of this course is to introduce the basic concepts of thermodynamics starting with the definitions of state variables, process variable, materials properties and the equation that relates them as well as the laws that direct their evolution. A global understanding of these relationships will permit to predict and quantify many physical processes such as phase transformation, chemical reaction, electrochemical processes etc. This course will also put a significant emphasis on describing the physical origin of thermodynamic parameters from the perspective of the microscopic structure of matter as well as describe the approach for practical laboratory measurements of thermodynamic variables.

The class will also include a weekly problem solving session for applying these novel concepts to practical examples.

Books:

Physical Chemistry, Peter Atkins, Julio De Paula, 9th Edition, Freeman 2010

Thermodynamics in Materials Science, Robert DeHoff, 2nd Edition, Taylor & Francis 2006
(Very rigorous treatment and systematic method for mathematically describing thermodynamic processes)

Thermodynamics, Statistical Thermodynamics, & Kinetics, Thomas Engel, Philip Reid, 2nd Edition, Pearson 2010

Grades:

Two midterms + one final	50%
Homeworks	50%

Homeworks

Assigned on Monday, due the following Monday. They are individual works and must be typed or handwritten extremely neatly. Solution to the homework will be reviewed during the recitation session on Monday 4-5pm, hence no late homework will be accepted.