**Subject: Thermodynamics of Materials (445.619)**

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Lecture Room: 31-310, (16:00 ~ 17:15)

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**Outline of the Lecture**

Although it takes time and efforts to understand thermodynamics, you will realize that it is much more worthy than your time and efforts once you realize the true meaning of thermodynamics. In this lecture, I will focus on fundamental understanding of the basic concepts of the thermodynamics, especially as to entropy, state function, free energy, and chemical potential. Based on these concepts, we will practice applying the thermodynamics to the real problems in the field of material science and engineering. At the same time, we will learn the limit of thermodynamics, i.e., what we can do and can’t do by thermodynamics. Finally, we will exercise some useful calculations of thermodynamic parameters using the Thermo-Calc software and their database.

**Evaluation**

Mid-term (40%)/ Final (40%)/ Attendance, Assignment, etc. (20%)

**Reference Books**

1. D.R. Gaskell, "Introduction to Metallurgical Thermodynamics,"

McGraw-Hill, 1973

2. R.T. DeHoff, "Thermodynamics in Materials Science"

McGraw-Hill, 1993

3. C.H. Lupis, "Chemical Thermodynamics of Materials,"

Elsevier Science Publishing Co., 1983.

4. J.B. Fenn, "Engines, Energy, and Entropy"

W.H. Freeman and Company, 1982.

5. M. Hillert, "Phase Equilibria, Phase Diagrams and Phase Transformations, Their Thermodynamic Basis," Cambridge University Press, (1998)