**Lecture Syllabus**

**Course title:** **Thermodynamics of materials**

**Course Number:** 445.301 (002), **Credits**: 3

**Instructor:** Prof. Sang-Im Yoo (Rm 131-407, [siyoo@snu.ac.kr](mailto:siyoo@snu.ac.kr), Tel : 880-5720)

**Prerequisite**: Modern Physics of Materials

**Class time & room:** Mon, Wed – 14:00 ~ 15:15, Rm 33-327

**Teaching Assistant:** Jae-Hyoung You (Rm 131-414, [jh31330@snu.ac.kr](mailto:jh31330@snu.ac.kr), Tel : 880-7443)

**Homepage:** *http://emdl.snu.ac.kr*

**Office hour**s: Mon, Wed – 15:30 - 16:30

**Course Description**

Principles of thermodynamics; properties of ideal gases and water vapors; first and second laws of thermodynamics; closed systems and control volume; basic gas and vapor cycles; entropy

**Course Objective**

Introduction to the properties of ideal gases and vapors and the development of the first and second laws of thermodynamics. The first and second laws of thermodynamics are applied to simple gas and vapor power and refrigeration cycles.

**Text:** D. R.Gaskell, Introduction to the thermodynamics of materials, Taylor&Francis, 5th Ed., 2007 (Chap 1-13)

**References:**

- D. V. Schroeder, An introduction to thermal physics, Addison Wesley Longman, 2000

-류한일, 풀어쓰는 재료열역학, 택스트북스, 2014

**Grading**: 30-min Quiz #1 (10%)

Midterm exam (25%)

30-min Quiz #2 (10%)

Final exam (35%)

Homework (20%)

(# absence more than 4 lectures = F)

**Lecture Contents**

- Chap. 1 Introduction and Definition of Terms (Lect. #1)

- Chap. 2 The First Law of Thermodynamics (Lect. #2~ Lect. #4)

- Chap. 3 The Second Law of Thermodynamics (Lect. #4~ Lect. #6)

- 1st quiz (2014.03.24)

- Chap. 4 The Statistical Interpretation of Entropy (Lect. #7~ Lect. #9)

- Chap. 5 Auxiliary Function (Lect. #10~ Lect. #11)

- Chap. 6 Heat Capacity, Enthalpy, Entropy, and the Third Law of Thermodynamics

(Lect. #12~ Lect. #14)

- Midterm Exam (2014.04.16)

- Chap. 7 Phase Equilibrium in a One-Component System (Lect. #15)

- Chap. 8 The Behavior of Gases (Lect. #16)

- Chap. 9 The Behavior of Solutions (Lect. #17~ Lect. #18)

- Chap. 10 Gibbs Free Energy Composition and Phase Diagrams of Binary Systems

(Lect. #19~ Lect. #20)

- 2nd quiz (2014.05.14)

- Chap. 11 Reactions Involving Gases (Lect. #21~ Lect. #22)

- Chap. 12 Reactions Involving Pure Condensed Phases and Gaseous Phases

(Lect. #23~ Lect. #24)

- Chap. 13 Reaction Equilibria in Systems Containing Components in Condensed Solution (Lect. #25~ Lect. #26)

- Final Exam (2014.06.16)