# ME/MS 505 Materials Thermodynamics

| Lectures | Lecture Topic | |
|---|---|---|
| 1 | Introduction (First Law) | Chapter 1 |
| 2 | First Law (Continued) | Chapter 2 |
| 3 | Second Law,<br>Statistics of Entropy I | Chapters 3 |
| 4 | Statistics of Entropy II | Chapter 4 |
| 5 | Auxiliary Thermodynamic Functions<br>Chemical Potential, Maxwell's Relations | Chapters 5 |
| 6 | Heat Capacity, Enthalpy, Entropy<br>and 3rd Law I | Chapter 6 |
| 7 | Heat Capacity, Enthalpy, Entropy<br>and 3rd Law II | Chapter 6 |
| 8 | One Component Phase Diagrams I | Chapter 7 |
| 9 | One Component Phase Diagrams II | Chapter 7 |
| 10 | Treatment of Gas Mixtures I | Chapter 8 |
| 11 | Treatment of Gas Mixtures II | Chapter 8 and Notes |
| 12 | Treatment of Condensed Systems I | Chapter 9 |
| 13 | | Discuss Homework set 3 |
| 14 | Treatment of Condensed Systems II | Chapter 9 and Notes |
| 15 | Binary Phase Diagrams I | Chapter 10 |
| 16 | Multi-component Phase Diagrams II | Chapter 10 and Notes |
| 17 | Gas Reactions | Chapter 11 |
| 18 | Gas-Condensed Phase Reactions | Chapter 12 |
| 19 | Multi-component reaction equilibria | Chapter 13 |

Required Text: Introduction to the Thermodynamics of Materials by David R. Gaskell, Prentice Hall (5th edition).

Reference Texts:

1. C.H.P. Lupis, Chemical Thermodynamics of Materials, Prentice-Hall, Englewood Cliffs, NJ.
2. D. Tabor, Gases, liquids, and solids and other states of matter, Cambridge University Press Syndicate, Cambridge
3. David Chandler, Introduction to Modern Statistical Mechanics, Oxford University Press, Oxford, New York.

# MS/ME 505

## Thermodynamics and Statistical Mechanics of Materials

Notes and Handouts

Required Text

Introduction to the Thermodynamics of Materials

by David R. Gaskell, Prentice Hall

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- C.H.P. Lupis, Chemical Thermodynamics of Materials, Prentice-Hall, Englewood Cliffs, NJ.
- D. Tabor, Gases, liquids, and solids and other states of matter, Cambridge University Press Syndicate, Cambridge
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# Course Grading

- Homework (Class Discussion)-No Grade
- Test 1: 25% (Oct. 5, 2016)
- Test 2: 25% (Nov. 9, 2016)
- Final Exam: 50%