

ME 541: Modern Thermodynamics, Spring 2010

Instructor:

Professor Xi Lin

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Course page: <http://oned.bu.edu/ME541>

Lectures: Tu & Th 12:00 – 2:00 PM

Office hours: Tu & Th 2:00 – 3:00 PM or email linx@bu.edu

Lecture notes: <http://oned.bu.edu/ME541/lecture.html>

Textbook: *Introduction to Modern Thermodynamics*, by Dilip Kondepudi, Wiley (ISBN: 978-0-470-01499-5)

References:

- 1) *Modern Thermodynamics: From Heat Engines to Dissipative Structures*, by Kondepudi and Prigogine, Wiley (ISBN: 978-0471-97394-2)
- 2) *Statistical Physics of Particles*, by Kardar, Cambridge (ISBN: 978-0-521-87342-0)

Pre-requisites by Topic:

ENG ME 304: Energy and Thermodynamics

Goals: To deliver an in-depth presentation of modern thermodynamics on irreversible processes and statistical mechanics

Grading:

Quizzes (60%): Every lecture on topics covered in last lecture

Individual final project (40%)

Lecture Schedule

1. Basic concepts
2. First law
3. Second law: the arrow of time
4. Entropy
5. Extremum principles
6. Gases, liquids, and solids
7. Phase transition
8. Solutions
9. Chemical transformation
10. Fields and internal degrees of freedom
11. Non-equilibrium systems
12. Radiation
13. Biological systems

14. Small systems
15. Stability theory
16. Critical phenomena
17. Statistical mechanics