PHYS 210B: Nonequilibrium Statistical Mechanics
Fall 2022

Texts and References

Required: none

Recommended:

i) "Nonequilibrium Statistical Mechanics"; R. Zwanzig

– Concise, physical, broad coverage

ii) "Physical Kinetics"; E.M. Lifshitz and L. Pitaevski

– Good for kinetic theory, detailed

iii) "Stochastic Processes in Physics and Astronomy"; S. Chandrasekhar (available as RMP, online)

– Golden oldie on stochastic processes, phenomena. Price is right!

iv) "Nonequilibrium Statistical Physics"; N. Pottier

– Accessible general text

v) "A Kinetic View of Statistical Physics"; P. Krapivsky, et al.

– Good treatment of advanced applications

vi) "Contemporary Kinetic Theory of Matter", J.R. Dorfman

– New look at a classic topic

References:

a) **Statistical Physics**

– "Nonequilibrium Statistical Physics — A Modern Perspective"; R. Livi, P. Politi

– "Stochastic Processes in Physics and Chemistry"; N.G. Van Kampen

– "Handbook of Stochastic Methods"; C.W. Gardiner

– "Qualitative Methods in Physical Kinetics and Hydrodynamics"; V.P. Krainov

– "Statistical Physics"; L.D. Landau, E.M. Lifshitz

– "Soft Matter Physics"; M. Doi

b) **Foundations**

– "Chaos in Dynamical Systems"; E. Ott

– "Hamiltonian Chaos and Fractional Dynamics"; G. Zaslavsky

– "An Introduction to Chaos in Nonequilibrium Statistical Mechanics"; J. R. Dorfman

– "Non-equilibrium Thermodynamics"; S.R. de Groot, P. Mazur

c) **Kinetic Theory**

– "The Mathematical Theory of Non-uniform Gases"; S. Chapman, T. Cowling

– "Qualitative Methods in Physical Kinetics and Hydrodynamics"; V. P. Krainov

d) **Fluids**

– "Fluid Mechanics"; L.D. Landau, E.M. Lifshitz

– "Fluid Dynamics for Physicists"; G. Falkovich

– "Hydrodynamic Fluctuations, Broken Symmetry, and Correlation Functions"; Dieter Forster

e) **Renormalization**

– "Lectures on Phase Transitions and the Renormalization Group"; N. Goldenfeld

– "Renormalization Methods — A Guide for Beginners"; D. McComb

$\rightarrow$ Additional references forthcoming.

$\rightarrow$ See "Handouts: Supplementary Materials" for additional material.