

PHYS 412 – MAT 502 Statistical Mechanics

Instructor: Ersin Göğüş

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Schedule:

Tuesday, 10:40 – 11:30 at FENS L062

Thursday, 14:40 – 1630 at FENS G029

Zoom:

<https://sabanciuniv.zoom.us/j/98849850364?pwd=YWhzVU9YZHRSM0xneIBCMElqRHpLZz09>

Textbook:

Statistical Physics by F. Mandl

Recommended:

Statistical Mechanics by R.K. Pathria and P.D. Beale

Fundamentals of Statistics and Thermal Physics by F. Reif

Contents:

- Basic probability concepts in statistical mechanics:
 - random walk, mean values, probability distributions
- Statistical description of systems of particles:
 - state of a system, statistical ensemble, basic postulates, probability calculations, density of states
- The statistical basis of thermodynamics
 - equilibrium conditions, reversible and irreversible processes, the laws of thermodynamics, the maximum entropy
- Basic methods of statistical mechanics:
 - Ensemble representations, approximation methods, the partition function, the equipartition theorem,
- Quantum statistics of ideal gases:
 - Maxwell- Boltzmann Fermi-Dirac, Bose-Einstein statistics; Blackbody radiation

Grading:

Homework (one in two weeks, 5 total): 30%

Midterm: 30%

Final: 40%