

STATISTICAL MECHANICS

3 credits

Bulletin description:

The Maxwell-Boltzmann distribution function and its applications to thermodynamic problems. Introduction to Bose-Einstein and Fermi-Dirac statistics. Prereq: PHYS 462

Instructor: Alexander Wagner
 South Engineering 210
 231-9582
 Alexander.Wagner@ndsu.edu
<http://physics.ndsu.edu/people/faculty/wagner>

Meetings: 14:00-16:00 Tuesday and Thursday, South Engineering 211
If you cannot make these times, please come to the first meeting and we will discuss the possibility of a different schedule.

Office Hours: Wednesday 10:00-12:00

Text: Mehran Kardar, *Statistical Physics of Particles*
 First Edition, Cambridge University Press, 2007

Optional: Kerson Huang, *Statistical Mechanics*
 Second Edition, John Wiley & sons, 1987

Topics:

week 01	Thermodynamics review
week 02-03	Probability
week 04-05	Kinetic Theory of gases
week 06	Lattice Boltzmann (simulations)
week 07-08	Classical Statistical Mechanics
week 09-10	Interacting Particles
week 11-12	Quantum Statistical Mechanics
week 13-14	Ideal Quantum Gases
week 15	Review
week 16	Project presentations

Schedule: Projects will be assigned in the sixth week of class. A paper on the project's results is due two weeks before the end of classes. A presentation on your project will be given in the last week of classes.

Extra requirements for Graduates: The graduate projects require a substantial component of independent work. The paper will contain original simulation results that do not yet exist in the literature.

Grading: Problem sets (20%)
 Project (30%)
 Tests 1 & 2 (15% + 15%)
 Final Exam (20%)
 A:80% – 100 %; B:60% – 79 %; C:40% – 59 %; D:30% – 39 %; F:0% – 29 %

- *Any students with disabilities who need accommodation in this course are encouraged to speak with the instructor as soon as possible to make appropriate arrangements.*
- *All work done in this course must be completed in a manner consistent with NDSU University Senate Policy, section 355: Code of Academic Responsibility and Conduct (<http://www.ndsu.nodak.edu/policy/355.htm>)*