

## Thermal & Statistical Physics

**Instructor:** Alexander Wagner  
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**Bulletin description:** Classical postulates and laws of thermodynamics; cyclic processes and entropy; thermodynamic potentials, equilibrium, stability, and phase transitions; Maxwell-Boltzmann distribution, applications to classical gases and magnets; quantum statistics, Bose-Einstein and Fermi-Dirac distributions, applications to quantum gases.

Prereq: PHYS 350.

**Goals:** This course provides students with an overview of Thermodynamics and Statistical Mechanics.

**Meetings:** 2:00pm - 3:15pm Tuesday, Thursday in South Engineering 221

**Attendance:** According to NDSU policy 333 attendance in classes is expected. Absences for NDSU sponsored extracurricula activities will be excused when appropriate documentation is provided. Online homework should be completed by the stated deadline. For medical reasons of family emergencies homework extensions will be granted on request. It is expected that extensions are requested before the expiration of the deadline whenever possible.

**Office hours:** 1:00 - 2:00pm Tuesdays, or by arrangement

**Text:** An Introduction to Thermal Physics, Daniel V. Schroeder, OUP

**Schedule:** Energy in Thermal Physics

The Second Law

Interactions and Implications

Engines and Refrigerators

Free Energy and Chemical Thermodynamics

Boltzmann Statistics

Quantum Statistics

Interacting Particles

We will cover about one chapter each 2 weeks.

**Blackboard:** This class does not use an online content management system.

**Grading:** Problems: 25pts

Test 1, Feb. 17.: 25pts

Test 2, Mar. 31: 25pts

Final, May 11, 8:00am-10:00am: 50pts

Grading scale: A:100-85, B: 84-73, C: 72-61, D:60-50, F: 49-0

**Illness:** Do not come to class if you are sick. Please protect your health and the health of others by staying home and participate in class remotely. If you are unable to attend class at the regularly scheduled time due to

illness, contact the instructor for alternate arrangements, especially for exams and extensions of homework due dates.

**Resources for Students on campus and remotely (telehealth):**

- Counseling Services: 701-231-7671; <https://www.ndsu.edu/counseling/>
- Disability Services: 701-231-8463; <https://www.ndsu.edu/disabilityservices/>
- Student Health Service: 701-231-7331; <https://www.ndsu.edu/studenthealthservice/>
- Dean of Students Office: 701-231-7701; <https://www.ndsu.edu/deanofstudents/>

**Additional Information:**

- *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.*
- *Veterans and student service members with special circumstances or who are activated are encouraged to notify the instructor as soon as possible and are encouraged to provide Activation Orders*
- *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>)*