

PHYSICS 730
STATISTICAL PHYSICS I

FALL 2020 / ON-LINE WRITTEN LECTURE NARRATIVES / No In-Person Meetings
(Formerly Watanabe Hall 420 / TTH, 1:30 PM - 2:45 PM)

Monday, August 24 – Friday, December 18
Last Day of Instruction: Thursday, December 10

Instructor

Dr. Chester Vause
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Prerequisites (UHM Catalog)

Physics 670

Textbook

“Statistical Physics” (3rd English ed., Part 1) Landau and Lifshitz Course of Theoretical Physics, Volume 5, E. M. Lifshitz and L.P. Pitaevskii (Pergamon Press, Oxford, 1980)

Student Learning Outcomes

Among the student learning outcomes of this course are to:

- (a) Understand the fundamental principles of equilibrium Statistical Mechanics as a microscopic theory, and how this theory provides the foundation of macroscopic Thermodynamics (“Laws of Thermodynamics”).
- (b) Develop and use various statistical equilibrium distributions, micro-canonical, canonical, and grand canonical, formulated by Gibbs.
- (c) Derive the connection between statistical correlations (fluctuations) and thermodynamic response functions, and thermodynamic extremum principles of various thermodynamic potentials.
- (d) Apply the theory to various macroscopic phenomena, from microscopic models of many-particle microscopic systems of macroscopic extent.
- (e) Applications include the Fermi, Bose, photon, and phonon ideal quantum gases, the classical ideal Boltzmann gas, paramagnetism, and elementary interacting systems (such as the non-ideal gas, van der Waals theory), thermodynamic theory of phase transitions.

Exams

Exams are TAKE-HOME EXAMS. The schedule is below, and is subject to change. Instructions will be given on the exam cover page. Basically, one uses the textbook, lectures notes, your own personal notes, and a calculator. No other sources of material are allowed. By taking these exams, you are abiding to the conditions set forth. The exams will be sent as a pdf file. It is preferable that your finished exam be scanned and returned to the instructor as a pdf file. If this is not possible, paper copy may be delivered to the instructors office, as will be noted in the specific exam directions.

Exam 1 Given: Monday, September 28, 2020 Due: Friday, October 2, 2020
Exam 2 Given: Monday, November 9, 2020 Due: Friday, November 13, 2020
Final Exam NO FINAL EXAM

Each Exam is based on material covered since the previous Exam. Each Exam is worth 50% of the final grade total score:

$$\text{TOTAL SCORE}(\%) = 50\% * (\text{EX1}(\%) + \text{EX2}(\%))$$

Grade Scale

Letter grade is determined from the total score according to the following scale:

A- (86%-90%)	A (91%-95%)	A+ (96%-100%)
B- (61%-70%)	B (71%-80%)	B+ (81%-85%)
C- (31%-40%)	C (41%-50%)	C+ (51%-60%)
	F (0%-20%)	D (21%-30%)

NO INCOMPLETE GRADE GIVEN

NOTICE

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