Syllabus – PHYS 451 – Spring 2019

Course Information:

PHYS 451:	Statistical Physics, 2 credits, Spring 2019
Meeting Times:	MW 3:30 to 4:30*
Meeting Location:	REIC 30X

*Your instructor will be out of the U.S. after Spring Break. Therefore I request that we complete the instruction prior to spring break with 3 hours per week of lecture. We can do this by either adding 30 minutes to the scheduled lecture period (the instructors preference), or by adding a third one-hour lecture on Friday, or an a day when schedules permit. We can finalize this schedule during the first lecture, on Jan 14th.

Instructor Information:

Instructor:	Donald Hampton, Associate Research Professor of Space Physics
Office:	701A Elvey (Geophysical Institute), TBD in Reichardt
Email:	dhampton@alaska.edu
Phone:	(907) 455-2256 (x2256 on campus)
Office Hours:	Tue: 2:00 pm to 4:00 pm or by appointment (Elvey)

Prerequisites:

PHYS F343 (Vibration and waves)
PHYS F351 (Thermal Physics)
PHYS F421 (Quantum Mechanics)

Textbook:

Required: *An Introduction to Thermal Physics* by Daniel V. Schroeder (Addison Wesley Longman ISBN: 0-201-38027-7)

Scope:

This course will introduce Statistical Physics, which is the study of the macroscopic state of materials by considering the statistics of the physical interactions of the microscopic particles that make up the material. The topic covers a wide range topics and techniques, of which this course will sample a subset, and typically only examine equilibrium states.

Approach:

My goals is that you learn the physical principles of the subject, well enough that you could have a conversation with your grandma, or art history cousin and be able to explain to them some of the basics of Statistical Mechanics. We will follow the outline of the book for the set of topics to cover, but I do not plan to simply lecture from the book. I will bring in other resources, and when possible try to discuss practical applications of Stat. Mech. in research relevant to UAF.

As an upper division course I expect that you have sufficient math skills to be able to manipulate the equations that we will introduce, and explore the problems. I also expect that you will do your best to solve the problems correctly, but my grading will not

severely punish honest math flubs. Therefore my advice is to explain to the greatest extent possible, your approach and interpretation.

Course Policies:
(a) *Attendance and participation in class is expected of all students*.
You will reap the greatest benefit from your investment in this course if you attend classes and work with the instructor and fellow students. While the path of the course will follow the book outline, I will bring in other resources during lectures, with the distinct purpose of providing techniques or methods for approaching problems that are different from those presented in our textbook. My job is to introduce the material and assess whether you have learned it. If I must rely solely on your written material but you have a difficult time in completing the problems, and do not discuss the subject matter with me either in the classroom or office hours, then I can only use your homework and exam performance to make that assessment. Therefore I have included a class participation line item in your final grade, which, based on our interactions allows me to adjust for poor test and homework performance.
(b) *Assignments are due at the beginning of class on the due date*.
I plan to assign 4 to 8 problems (depending on difficulty) each week, which will be due on the following Wednesday.
(c) *The final written solutions to homework problems must be the individual's work*.
I encourage working together on solutions, but the final writeup needs to be in your own words (see Academic Honesty below). Further, you must acknowledge all sources of information – including fellow students – in homework solutions. As a practicing scientist you will be expected to do the same, so now is a good time to start learning how.

Course Grading:

Homework	50%
Midterm	20%
Class Participation	5%
Final	25%
Total	100%

Schedule:

Topic (Chapter)	Week	Dates
Boltzmann Statistics (6)	1-2	Jan 14 – Jan 23
Quantum Statistics, part I (7.1 – 7.3)	3-4	Jan 28 – Feb 6
Midterm Exam	5	Feb 13
Quantum Statistics, Part II (7.4 – 7.6)	5-6	Feb 11 – Feb 20
Interacting Particles (8)	7-8	Feb 25 – Mar 6
Final Exam		TBD

Academic Honesty

UAF expects and requires academic honesty from all members of the University community, and takes any act of plagiarism and cheating seriously. It is expected that all assignments, including homework and reports, that are turned in for this course must the original work of the individual student. Failure to comply with this policy will result in penalty as stipulated under UAF regulations. The UAF catalog states: "The university may initiate disciplinary action and impose disciplinary sanctions against any student or student organization found responsible for committing, attempting to commit or intentionally assisting in the commission of . . . cheating, plagiarism, or other forms of academic dishonesty . . ."

Student Protection and Services Statement:

Every qualified student is welcome in my classroom. As needed, I am happy to work with you, disability services, veterans' services, rural student services, etc. to find reasonable accommodations. Students at this university are protected against sexual harassment and discrimination (Title IX), and minors have additional protections. As required, if I notice or am informed of certain types of misconduct, then I am required to report it to the appropriate authorities. For more information on your rights as a student and the resources available to you to resolve problems, please go the following site: www.uaf.edu/handbook/.

UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: https://alaska.edu/nondiscrimination/.

The UAF Office of Disability Services implements the Americas with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. Any student who may need assistance with disabilities, should feel free to contact the instructor or directly to the Office of Disabilities Services (208 WHIT) by calling 907- 474-5655, or through email: uaf-disability-service@alaska.edu.

Your instructor follows the University of Alaska Fairbanks Incomplete Grade Policy: "The letter "I" (Incomplete) is a temporary grade used to indicate that the student has satisfactorily completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Neither negligence nor indifference is an acceptable reason for an "I" grade."