West Chester University

Department of Physics

Physics 350 – Thermodynamics

Meeting Time: MWF 9:00 - 9:50 am

Meeting Place: Merion Science Center 109

Instructor: Jeffrey J. Sudol (Dr. Jeff)

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Office Hours: MWF 10-11, TR 3-4

Course Description

Physics 350 is a course in Thermodynamics and Statistical Mechanics for physics majors.

Required Course Materials

- ✓ *Statistical and Thermal Physics* by Harvey Gould and Jan Tobochnik.
  ISBN: 9780691137445
- ✓ a scientific calculator

Course Goals

1. Exercise and develop language skills (reading, writing, and discourse).
2. Exercise and develop reasoning skills.
3. Exercise and develop metacognitive skills.
4. Develop and improve those mental models needed to solve qualitative and quantitative problems in thermodynamics and statistical mechanics.

Assessment

Your "grade" in this course will be based on your performance on four regular exams and one final exam.

Regular exams are those exams that occur in lecture during the course of the semester. At the end of the semester, I will drop your lowest regular exam score and average the remaining exam scores. The final exam is cumulative, and it counts. In total, your final grade will be based on four exams, weighted equally.

It sounds nice, but here's the catch!

Except for University sanctioned events, there are no excused absences, no makeup exams, and you cannot take an exam early or late.

What does this mean? It means that if you miss a regular exam, you receive a score of a zero on that exam, regardless of the reason for missing the exam. I drop the lowest exam score, so you can miss one regular exam, and it will not affect your final grade. If you do miss an exam, I recommend that you make arrangements with me to take the exam as it will serve to test your knowledge and prepare you for the final exam, which is cumulative, and it counts.

I do this for the following reason. It takes me about eight hours to write an exam. The exams are exquisitely crafted to test the objectives of the course so that the exam scores represent an accurate measurement of how well the students (and I) have met the objectives of the course (we are a team). If I were to allow students to take exams at different times, I would have to write multiple exams to preserve the integrity of each exam (this is an ethical code; it's nothing personal), and I would have to do so in a way that all of the exams test the same objectives equally well. So, "makeup exams" represent a huge time sink, and I simply cannot afford that time sink.

I assign letter grades according to the following scale.

93 - 100	A
90 - 93	A-
87 - 89	B+
83 - 86	B
80 - 82	B-
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and so on...	

I do not norm-reference (or scale) grades.

I also reserve the right to introduce different forms of assessment as needed and to alter the weight of each of the categories of assessment in the event of some unforeseen circumstance.

Disability Statement

If you require special accommodations because of a disability, please meet with me as soon as possible to discuss your needs. Supporting documentation is required.

Academic Integrity Statement

If you commit a violation of academic integrity, you will receive zero credit for the entire course. This is not negotiable. For more information regarding violations of academic integrity, consult the Undergraduate Catalog.

University Sanctioned Events

If you will be participating in a University-sanctioned event that occurs at the same time as an exam (the exam times on the schedule are fixed), you must notify me prior to the exam. Documentation supporting your participation in this event is required. We will then make arrangements for you to take the exam either prior to or at the scheduled exam time through a proctor. For more information on University Sanctioned Events, consult the Undergraduate Catalog.

Day		Date	Topic	Chapter
1	M	Aug. 29	Introduction	
2	W	Aug. 31	Major Concepts: Equilibrium	1.1-1.4, 1.7
3	F	Sep. 02	Major Concepts: The Microscopic Picture	1.4
	M	Sep. 05	*No class - Labor Day*	
4	W	Sep. 07	Major Concepts: The Macroscopic Picture	1.5-1.6, 1.8-1.12
5	F	Sep. 09	Temperature and Thermometers	2.1-2.4
6	M	Sep. 12	Thermodynamic Process, Work	2.6-2.7
7	W	Sep. 14	Exact Differentials, Equations of State	2.24.1, 2.5, 2.8
8	F	Sep. 16	First Law of Thermodynamics	2.8-2.9
9	M	Sep. 19	Heat Capacity (Calorimetry)	2.10
10	W	Sep. 21	Review	1, 2.1-2.10
11	F	Sep. 23	**Exam I**	1, 2.1-2.10
12	M	Sep. 26	Adiabatic Processes	2.11
13	W	Sep. 28	Second Law of Thermodynamics	2.12
14	F	Sep. 30	Engines: Efficiency and Engine Cycles	2.13-2.14
15	M	Oct. 03	Engines: Entropy Changes	2.15
16	W	Oct. 05	TdS equations	2.17-2.18
17	F	Oct. 07	Third Law of Thermodynamics	2.19-2.20
	M	Oct. 10	*No Class - Fall Break*	
18	W	Oct. 12	Legendre Transformations, Free Energies	2.24.2, 2.21
19	F	Oct. 14	Free Energies, Maxwell Relations	2.21-2.22
20	M	Oct. 17	Irreversible Processes	2.23
21	W	Oct. 19	**Exam II**	
22	F	Oct. 21	Probability Theory	3.1-3.3
23	M	Oct. 24	Information and Uncertainty	3.4
24	W	Oct. 26	The Binomial Distribution Stirling's Approximation	3.5
25	F	Oct. 28	Continuous Probability Distributions The Central Limit Theorem	3.6-3.7
26	M	Oct. 31	Statistical Mechanics: Methodology	4.1
27	W	Nov. 02	Applications	4.2
28	F	Nov. 04	Applications	4.3
29	M	Nov. 07	Applications	4.4
30	W	Nov. 09	**Exam III**	
31	F	Nov. 11	Microcanonical Ensembles	4.5, 4.10
32	M	Nov. 14	Canonical Ensembles	4.6, 4.11
33	W	Nov. 16	The Connection between Thermodynamics and Statistical Mechanics	4.7
34	F	Nov. 18	Grand Canonical Ensembles	4.12
35	M	Nov. 21	The Ideal Gas	6.1
	W	Nov. 23	*No class - Thanksgiving Break*	
	F	Nov. 25	*No class - Thanksgiving Break*	
36	M	Nov. 28	Classical Statistical Mechanics	6.2
37	W	Nov. 30	Bosons and Fermions	6.3-6.4
38	F	Dec. 02	Photons	6.5
39	M	Dec. 05	The Equation of State for an Ideal Gas	6.6
40	W	Dec. 07	**Exam IV**	
41	F	Dec. 09	Special Topics	
42	M	Dec. 12	Special Topics	
	W	Dec. 16	**Final Exam 8-10 am**	