Chem 339   **Statistical Thermodynamics and**   **Spring 2017**
Alternative   **Equilibria in Gas Phase Reactions**
P. W. Hladky

I. Course Description

Chem 339 Due to a personnel situation that makes offering the traditional Chem 339 impossible, an alternative special topics course - Statistical Thermodynamics and Equilibria in Gas Phase Reactions.- will be offered in its place. The course will cover the foundations of statistical thermodynamics and show how the molecular-level properties of ideal gas molecules are used to calculate macroscopic thermodynamic properties of ideal gas molecules and the equilibrium constants of gas phase reactions. Instead of making spectroscopic measurements, the traditional focus of Chem 339, this course will focus on some of the applications of spectroscopic data. The course will be worth 1 cr and the traditional 3 hrs lab per wk will be modified to be 1 hr lec and 2 hr problem solving each week. Prereq: 336 or cons instr.

II. Schedule

A preliminary schedule of topics is given in the table below. Take home assignments (open book and notes) will be given during the semester.

Wk	Chp:Sec	Topics
1	--	Math Review
2	--	Thermodynamics Review
3	1:1-3	Statistical Mechanics, Ensembles & Postulates, Canonical Ensemble
4	1:3-4	Canonical Ensemble & Thermodynamics
5	3:1-2	General Relations for Independent Distinguishable and Indistinguishable Molecules and Subsystems
6	3:3	
7	4:1-2	Ideal Monatomic Gas
8	4:4	
9	8:1-2	Ideal Diatomic Gas
10	8:3-4	
11	9:1-2	Ideal Polyatomic Gas
12	9:3-4	
13	10:1-2	Chemical Equilibrium in Ideal Gas Mixtures
14	10:3-4	
15	TBA	To Be Announced
16	**Final Exam**	

III. Principle Assignments

Chapter note sheets will be provided at the start of each chapter and will be collected and checked at approptiate times. Sets of recommended problems will be handed out for each chapter. Some of the problems will be taken from the course text while others will come from other sources.

I expect your assignments to be complete, neat, organized, and legible; points will be deducted for substandard work.

IV. Evaluation

Chapter Notes (raw score scaled to 20)	20 pts
Take-home assignments (raw score scaled to 150)	150 pts
Final Assignment	30 pts
Total	**200 pts**

* Grades will probably be assigned according to the following scheme: 90.0-100%, A; 85.0-89.9%, A-; 80.0-84.9%, B+; 75.0-79.9%, B; 70.0-74.9%, B-; 65.0-69.9%, C+; 57.0-64.9%, C; 50.0-56.9%, D+; 45.0-49.9%, D; 44.9% and lower, F. I reserve the right to adjust the grading scheme to the benefit of the students.
* There are no *individualized* extra-credit opportunities in this course.

V. Student Conduct and Special Accommodations

UWSP policies concerning student academic standards and disciplinary procedures can be found in Section II of the UWSP **Community Bill Of Rights And Responsibilities**. This document is available on the UWSP Website.

If you need special accommodations for religious beliefs or learning disabilities, you should consult the appropriate offices and policies at UWSP and then see me as soon as possible so that we can make appropriate arrangements for your situation. UWSP's University Catalog has some information and it can direct you to other resources.

VI. Bibliography

Textbook. Hill, T. L., <u>Introduction To Statistical Thermodynamics</u>, Addison-Wesley , Reading, MA, 1960. (The Dover reprint is acceptable)