

Physical Chemistry I

Instructor	Prof. Tom Trainor
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Class meeting	MWF 10:30-11:30
Lab	Tuesday 11:30 – 2:30
Office hours	By appointment.
Text	Atkins, DePaula and Keeler, Physical Chemistry 11 th Edition

Course Overview: Chemistry 331 is the first semester of a two-semester series in physical chemistry. The course will cover principles of thermodynamics and kinetics with applications to phase equilibria, solutions, chemical equilibrium and electrochemistry.

Prerequisites: CHEM F106X, MATH F252X, PHYS F124X or PHYS 212X.

Learning Outcomes: At the end of the course students will have an understanding of thermodynamic and kinetic principles, their mathematical development, and application to chemical problems.

Course structure: The course primarily follows your text, in the order described in the attached schedule of topics. During Tuesday and Thursday classes I will lecture on the material in the book. Reading the book before the lectures will be important for following and understanding the lectures. We will also have weekly in-class quizzes based on the lecture material and assigned problems. These quizzes are an important part of the course as they will help you to stay current with the course material. This course also has a laboratory section to give examples of in-class concepts.

Exams, Quizzes, & Grading: Your course grade will be based on the total points of the regular exams, the final exam, the quiz scores, and possibly extra credit exercises. Material assigned in readings, in lecture, or in homework problems may appear on an exam. The maximum number of points for each is given below:

Exams (150 pts each)	300
Final exam	100
Quizzes	100
Labs	150
Total	650

Make-up exams will be allowed if you have a good reason. If you anticipate an absence (work commitments, intercollegiate sports, etc.), talk to me **before** the exam to make arrangements. If the absence is unexpected, *talk with me at the earliest possible opportunity*. Students with documented disabilities who may need reasonable

academic accommodations should discuss these with me during the first two weeks of class. You will need to provide documentation of your disability to Disability Services in the Center for Health and Counseling, 474-7043, TTY 474-7045

Homework: Homework and quizzes are a critical aspect of learning physical chemistry. Every week you will be assigned homework exercises. These are not graded (you do not have to turn them in), and you will be provided with answer keys. If you attempt a problem but don't get an answer, see me for help. A few of these exercises are selected to improve your mechanical skills and also help you to find the right formula to apply to a problem. Many of the problems will be conceptual in nature. These questions should reinforce topics covered in lecture and provide examples of how the concepts are applied for problem solving.

Quizzes: Short quizzes will be given weekly. The purpose of the quiz is to provide a frequent check on learning progress. Doing the homework diligently is the best way to assure good grades on the quizzes, and past experience has shown that good quiz grades translate to good course grades. There will be no makeup quizzes, but your two lowest quiz grades will be dropped.

Exams: The *tentative* exam dates are:

<u>Exam</u>	<u>Material Included</u>	<u>Tentative Date</u>
1	Weeks 1-5	05-Oct
2	Weeks 6-10	02-Nov
Final	Approximately 50% weeks 11-15, 50% cumulative	14-Dec, 10:15am

Tentative Grade Scale: If you get at least 90%, you are guaranteed an "A". I may elect to set the grade cutoffs lower, but we will not set them higher.

<u>Grade</u>	<u>Percentage</u>
A	90
B	80
C	70
D	60

Important Dates:

Sept 9 – Deadline for late registration
Sept 9 – Deadline for drop
Nov 4 – Deadline for withdrawal
Nov 23-27 – Thanksgiving holiday

Tentative Schedule of Topics:

Week	Chapter	Topic
1	1	Gases (ideal and real)
2	2	Heat, work, internal energy. First law
3	2	Enthalpy, thermochemistry
4	2, 3	State functions. Entropy
5	3	Second law and direction of spontaneous change
6	3	Entropy and Gibbs energy
7	4	Phase transitions of pure substances
8	5	Simple mixtures
9	5	Phase diagrams, non-ideal solutions, activities
10	6	Equilibrium
11	6	Equilibrium electrochemistry
12	16	Diffusion and transport properties
13	17	Kinetics (Thanksgiving)
14	17, 18	Kinetics and reaction dynamics
15		Final review