

SYLLABUS

- COURSE:** CHEMISTRY 325
Physical Chemistry I - Thermodynamics and Kinetics
Spring Semester, 2017
MWF 8:30-9:35 p.m. (Labs TBA)
- INSTRUCTOR:** Dr. K. A. Martin
Rohr Science 305 Phone 619.849.2329
Office Hours -- MWF 10:45 -2 pm,
TR 10 – 12:00 pm and by appointment
- TEXT:** Thermodynamics, Statistical Thermodynamics, & Kinetics,
3rd Edition, Thomas Engel and Philip Reid, San Francisco, Pearson /
Benjamin Cummings, 2013. Also MasteringChemistry associated with the
textbook.
- DESCRIPTION:** The first part of this course is designed to direct students through a detailed study of the fundamentals of thermodynamics. The course content in this part will center on the laws of thermodynamics with particular attention given to the application of these laws to chemical systems. This part will include the study of such concepts as heat, work, enthalpy, entropy, standard states, phase diagrams, colligative properties, free energy, and equilibrium. The second part of the course will focus on the fundamentals of chemical kinetics, and reaction dynamics.
- LEARNING OUTCOMES:** By the end of the course students will be able to:
- 1) Define and use the concepts of internal energy, enthalpy, entropy, and Gibbs energy to characterize equilibrium and predict the direction of spontaneous change.
 - 2) Use simplifying models to represent complex physical and/or chemical systems for the purpose of fundamental analysis.
 - 3) Use the laws of thermodynamics, the concepts of chemical kinetics, and techniques from calculus, to solve physical and chemical problems appropriate for the undergraduate chemistry major.
- Students will have also acquire and/or improve specific skills useful for future work in science or science related fields. In particular, collect accurate and useful data; analysis such data using graphical techniques, spreadsheets and other appropriate computer software; and draw meaningful conclusions from experimental results and present those in cogent written and oral form.
- Program Learning Outcomes: CHEM PLO 2 (UV-vis) and BCHM PLO 3 (UV-vis) will be assessed directly by faculty laboratory instructors' observation of students' use of instruments.
- ATTENDANCE:** You are expected to be at all scheduled meetings of the lecture and lab. Missing class will not only diminish your chances of understanding course content, but it will have a negative impact on your course grade. For further details see the university's attendance policy.

HOMEWORK: Much of the material in this course is best learned by working problems. Therefore, problem sets will be assigned regularly. A typical assignment will be composed of two types of problems — work problems and quiz problems. Work problems will be graded with a +, ✓, or --, and students may collaborate on these problems. Quiz problems are mini take-home exams and every student is expected to do these problems individually.

LABORATORY: Laboratory experiences are part of this course. Some of these will be computer-based simulations and the rest will be actual laboratory experiments. Lab work will be done by teams of students but laboratory reports must be prepared and submitted individually. Further information regarding the labs is contained in a separate laboratory syllabus.

GRADING: Grade points will be earned according to the following breakdown:

Exams (3)	50%
Homework & Class Participation	25%
Lab Reports	25%

Grades will be assigned according to the following approximate scale. Plus and minus grades are assigned within these brackets.

Approximate Grading Scale	85 - 100%	A
	75 - 85%	B
	65 - 75%	C
	55 - 65%	D
	0 - 55%	F

CLASS SCHEDULE:

	<u>Sessions</u>	<u>Topics</u>	<u>Readings</u>
1		Fundamental Concepts of	Ch. 1
		Thermodynamics	
2-5		The First Law	Ch. 2
6-10			

		Intern al Energy and Enthalpy Ch. 3
11-12		
		Therm ochemistry Ch. 4
13-19		
		The Second Law and Entropy Ch. 5
Feb 24	EXAM #1 (Chapters 1-5)	
21-24		
		Chemi cal Equilibrium Ch. 6
25		
		Prope rties of Real Gases Ch. 7
26-27		
		Phase Diagrams Ch. 8
28-31		
		Ideal and Real Solutions Ch. 9
Mar 31	EXAM #2 (Chapters 1-9)	
33-36	Kinetic Theory of Gases	Ch. 16
37-42		
		Eleme ntary Chemical Kinetics Ch. 18
		Compl

FINAL EXAMINATION, MONDAY, MAY 1, 7:30-10:00am

UNIVERSITY POLICIES

INCOMPLETES AND LATE ASSIGNMENTS

All assignments are to be submitted/turned in by the beginning of the class session when they are due—including assignments posted in Canvas. Incompletes will only be assigned in extremely unusual circumstances.

FINAL EXAMINATION POLICY

Successful completion of this class requires taking the final examination **on its scheduled day**. The final examination schedule is posted on the [Class Schedules](#) site. No requests for early examinations or alternative days will be approved.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See [Academic Policies](#) for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See [Disability Resource Center](#) for additional information.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See [Academic Policies](#) in the Undergraduate Academic Catalog.