

UNIVERSITY OF CENTRAL FLORIDA
Department of Chemistry
Physical Chemistry I
CHM-3410
FALL 2016

Instructor: Dr. Florencio Eloy Hernández

Office: Physical Sciences Building, Room 346

e-mail: Florencio.hernandez@ucf.edu

“Lectures”: M, T, W, and F 09:30 to 10:20. Room: CB1 309

Office Hours: Wednesday from 2:00 to 4:30 PM, Friday after 2:30 PM, or by appointment.

Teaching Assistant: Julie Donnelly

Objectives: In this course you will learn the physical and mathematical bases of macroscopic thermodynamics and kinetics with applications to chemical systems.

Texts: “*Chemical thermodynamics*” 2nd Edition, by Peter Rock
* “*Chemical Kinetics and Dynamic*”, 2nd Edition, by Jeffrey Steinfeld, Joseph S. Francisco, and William L. Hase.
□ “*Physical Chemistry*”, 6th Edition, by Peter Atkins

Grade Distribution

Homework:	500 (28 assigned, maximum credit for 25)
Class Activities:	300 (56 assigned, maximum credit for 50)
Pre & Post Test:	100 (Assessment of Learning)
Participation:	100 (10 points each, maximum credit for 10)

Maximum Points: 1000

Grading Scale	<u>Letter Grade</u>	<u>Total Point</u>
	A	931 - 1000
	A-	851 - 930
	B+	801 - 850
	B	701 - 800
	B-	651 - 700
	C+	601 - 650
	C	551 - 600
	C-	501 - 550
	D+	451 - 500
	D	351 - 450
	D-	301 - 350
	F	0 - 300

Course Requirements

This course is not easy. It may very well be one of the hardest courses you take while an undergrad. However, with attention you can pass this course and actually learn something!

Please complete the one-question quiz currently open in Web Courses as soon as possible!

This semester the instructor will use a reversed learning scheme in an informal learning space, combined with a no-test assessment philosophy. Because this lecture forms part of an innovative educational program designed to help student improve their performance in senior-level courses, students will be required to sign a consent IRB form.

Using this approach the instructor will provide/assign specific material with content information and practice through Webcourses before class; invite students to build their preferred learning space by rearranging the classroom setup, allow students to use any technology or tools for real-time consultation, facilitate short class-wide discussions about the fundamental concepts and their applications in real life, encourage attendance, peer-to-peer interactions and learning through the assignment of short activities in class, and will create an atmosphere of camaraderie and healthy competition to foster self-motivation.

Students are required to be punctual, to attend all lectures and to complete all assignments and activities by the due dates. Attendance is critical to student success as is active participation in the various activities that will be completed during each class. Additionally, students are expected to complete all assignments/readings before each class to facilitate a better exchange of ideas during the class time. Any out-of-class assignments handed in late will automatically be reduced by one letter grade.

Students are expected to approach this course with a certain degree of responsibility and maturity. The UCF Code of Conduct is to be followed at all times and the University's "Golden Rule" will be observed in all cases. The instructor has the discretion to give a student a zero for any activity or assignment or withdraw any student from class for violation of these policies.

All students are required to complete all class activities as well as all assignments throughout the term as scheduled. In extreme, unavoidable, and unexpected circumstances a student may request they be allowed to "make up" assignments or be granted an extension to turn in an assignment. Any such allowances are at the discretion of the instructor and will be made on a case by case basis. For approved excused absences, the student will be required to make up the assignment prior to the next regularly scheduled class. Any student unable to attend class because of *previously known special or extraordinary circumstances* when an assignment is due should e-mail the assignment to the instructor at least 24 hours before the class providing prior arrangements have been made (i.e. instructor has been informed of the situation by the student).

Students are responsible for contacting the instructor at least 48 hours prior to class or due date of an assignment if they are unable to attend class on the applicable date. At the discretion of the instructor, the student may be asked to provide documentation regarding their absence. An unexcused absence will result in a grade of zero for missed activities or assignments.

Method of Instruction

Class sessions will include short-lectures, problem solving activities, and class discussion. As this is a 3000 level class, **student participation in class has many benefits and is required.** Participation by students reinforces concepts for others, identifies areas in the materials that may be unclear, and provides additional insights into the materials. In most class sessions, the instructor will provide additional information and/or insights that are not included in the required materials; therefore, students should make every effort to attend all classes.

In order to ensure students are prepared for class each week and thus provide a more meaningful “lecture”, a series of assignments will be completed each week. These assignments will be developed by the instructor or taken from the exercises and problems at the end of each chapter. More information about the due dates and times of these assignments, as well as the points assigned to each one, is available on Webcourses.

Topics to be covered:

1. Scope of Thermodynamics
2. Temperature
3. First law
4. Second law
5. Thermodynamic Functions
6. Third Law
7. Thermodynamics of Chemical Reactions
8. Chemical Potential and Phase Rule
9. Phase Equilibria
10. Equilibrium Constant
11. Activities of Solution-Phase Species
12. Thermodynamics of Ions in Solution
13. Phase Equilibria in solutions
14. Chemical Kinetics-Basics *
15. Complex Reactions *
16. Introduction to Statistical Thermodynamics

IMPORTANT: The instructor reserve the right to modify the schedule, the testing procedures or the grading basis, if in the professional judgment of the instructor, such modification is in the best interest of fulfilling the course objectives and assuming the academic integrity of the course and the institution.