CHEM 4311 – Physical Chemistry I
Fall Semester, 2017

Course Description: Modern theory of physical chemistry as applied to the various states of matter.

Class Meetings: MWF, 11:30 am-12:25 pm, Room: CHEM 116.

Pre-requisites: MATH 2376 Calculus II

Instructor	**Office Hours**
Dr. Ozge Gunaydin-Sen, Chemistry Bldg. Rm. 121P 409-880-8275 ozge.sen@lamar.edu	Tuesday 1-3 pm, Wednesday, 2-5 pm, or by appointment

Required Textbook: Physical Chemistry, 10th Edition by Atkins and dePaula.

Other Recommended Books:

- Silbey, R.J., Alberty, R.A. and Bawendi, M.G., Physical Chemistry, 4th edition, 2005, John Wiley & Sons, Hoboken, NJ, pp944.
- Angel, T., Reid, P., Physical Chemistry, 3rd edition.
- Student Solutions Manual to Accompany Physical Chemistry of Atkins and dePaula

Grading (subject to change)

Assessment	Approximate Percentages
Homework Assignments	10%
Quizzes	10%
Regular Exams (3)	60%
Final Exam	20%

A	90-100%
B	80-89%
C	70-79%
D	60-69%
F	< 60%

***CHEM 5301: This is a course graded either satisfactory or unsatisfactory with satisfactory performance being established at 70% and above.**

Course Information and Policies

Physical chemistry may well be one of the most challenging course you will ever have. Learning this material requires careful reading and rereading of the book, reflective analysis of concepts and relationships, and continual practice through working on exercises and problems. This means that you cannot get behind in your studies and hope to make it up the night before an exam.

On a ***daily*** basis, you **must**

- **Preview the relevant textbook sections before we encounter them in lecture.** Reread them in depth as soon as possible after lecture.
- **Study all the derivations and examples in the textbook** until they are completely clear to you, filling in the missing steps and checking units.
- **Do exercises and problems!** Each one that I assign illustrates an important concept, careful rereading and study is required to solve them. *You will not learn effectively by reading or copying problem solutions*. In this way, the homework problems are diagnostic. If you can't do them, you have missed something important and you need to figure out what that is. Attempt problems immediately after covering the material; if you can't do them, reread the material. If you still can't do a problem, then seek help.

Major topics covered:

Laws of thermodynamics; equilibrium states; simple mixtures; rate of chemical reactions; physical chemistry of macroscopic states.

Chapter	***Topics***
1	The Properties of Gases
2	The First Law
3	The Second Law and Third Laws
4	Physical Transformations of Pure Substances
5	Simple Mixtures
6	Chemical Equilibrium
20	Chemical Kinetics

Learning Outcomes:

1) Fundamental knowledge of the relationship between structure of molecules and their physical properties
2) Learn how to use the equation of state of an ideal and non-ideal gas to calculate pressure, volume, temperature with a given data and understand the behavior of gases under given conditions.
3) Discuss and understand the details of the law of thermodynamics, learn the key definitions such as heat, work, internal energy, enthalpy, entropy, etc. and their relationships with each other. Learn the Maxwell relations.
4) Understand the phase diagrams, chemical potential, and thermodynamics of mixtures.
5) Discuss and analyze kinetics, reaction mechanisms, rate of chemical reactions and rate laws.
6) The ability to solve numerical problems.
7) The ability to recognize physical chemistry solutions to practical problems

Homework Assignments: Homework will be assigned at the end of most class meetings. It will be collected on a random basis and checked for completeness. Late homework will not be accepted.

> *A comment about working collaboratively:* It's common to work together on the homework assignments, and at times it can be a useful strategy. However, who work on assignments only with a group almost always have poor exam scores. ***It is very important to solve the problems on your own!*** My suggestion is to consult with other students only after you have made a diligent and thorough attempt to do the homework on your own. Ask a few questions, discuss the solution in general terms, and then try again to do the problem by yourself.

Quizzes: Short quizzes will be given in some of the class meeting, except for test days. Each quiz will have 2-5 questions based on recent textbook reading assignments or previous lecture material. There are no make-ups on the quizzes, but the lowest quiz score or two will be dropped.

Exams: There will be three exams during the semester. Requests for make-ups for medical reasons or other situations will be considered on a case-by-case basis, with written documentation required at my discretion. After proper documentation:

MAKE-UP EXAM = FINAL EXAM

The FINAL EXAM grade will replace the properly documented missed exam grade.

Tentative Exam Schedule (Subject to change):

Exam 1 (September 29)
Exam 2 (October 25)
Exam 3 (November 20)

Final Exam: The final exam will be comprehensive. The time is scheduled: 12/11/2017, Wednesday 11:30 am. - 12:25 pm.

Cell Phones: Cell phones are prohibited during class. Turn them off and leave them in your bag.

Attendance:

Regular class attendance is important to the attainment of the educational objectives of the University. Attendance will be checked daily (see federal policies)**.**

Federal Policies:

Title IV Policy: Each semester, every faculty member will be required to check attendance records, and then indicate any student who is no longer attending the class. The checked rolls will be signed by the faculty member and returned to the Registrar's office.

FERPA (Family Education Rights Privacy Act of 1972): Due to the privacy laws regarding student grades in FERPA, a student's grade cannot be discussed with anyone other than student – no one else including parents and/or friends. This includes emails, voice mails, over the phone, answering services, etc. Therefore the student must appear in person to insure identity and can only access their grade.

OTHER ISSUES

- Academic dishonesty will not be tolerated. A grade of F will be assigned to anyone who cheats. See current issue of your Student Handbook for details. The use of cell phones and other communications device is strictly prohibited during tests.
- If you are registered as a student under the Americans with Disabilities Act (ADA), you must inform the instructor (Dr. Gunaydin-Sen), during the first week of classes so that reasonable accommodations may be made.

Emergency Procedures

Many types of emergencies can occur on campus; instructions for severe weather or violence/active shooter, fire, or chemical release can be found at: http://www.lamar.edu/about-lu/administration/risk-management/index.html. Following are procedures for the first two:

Severe Weather:

- Follow the directions of the instructor or emergency personnel.
- Seek shelter in an interior room or hallway on the lowest floor, putting as many walls as possible between you and the outside.
- If you are in a multi-story building, and you cannot get to the lowest floor, pick a hallway in the center of the building.
- Stay in the center of the room, away from exterior walls, windows, and doors.

Violence/Active Shooter (CADD):

- **CALL -** 8311 from a campus phone (880-8311 from a cell phone). Note: Calling 911 from either a campus phone or cell phone will contact Beaumont City Police Dispatch rather than University Police.
- **AVOID-** If possible, self-evacuate to a safe area outside the building. Follow directions of police officers.
- **DENY-** Barricade the door with desks, chairs, bookcases or any other items. Move to a place inside the room where you are not visible. Turn off the lights and remain quiet. Remain there until told by police it is safe.
- **DEFEND-** Use chairs, desks, cell phones or whatever is immediately available to distract and/or defend yourself and others from attack.