Name: Dr. Brian Barngrover  
Department: Chemistry & Biochemistry  
Email: barngrovbm@sfasu.edu  
Phone: (936) 468-1568  
Office: M-124  
Student Hours: MRF 11:00 am – noon, MR 1:30 – 2:30 pm; other times by appointment  

Text and Materials:  
*Physical Chemistry*, by Silbey, Albery, and Bawendi, 4th edition (required)  
CRC Handbook of Chemistry and Physics (optional)  
Calculator  

**COURSE CALENDAR: ON SEPARATE PAGE**  

**GRADING POLICY:** Grades are based on the total number of points earned out of 800.  
The grading scale is: [A≥720; B≥640; C≥560; D≥480; F≤479]  

**Grade Breakdown**  
Laboratory 150 pts  
Homework 100 pts  
Quizzes 400 pts  
Final Exam 150 pts  
800 pts  

**Chapters to be covered**  

**Weeks 1-12: Thermodynamics**  
1 Fundamental Concepts  
3 State Functions, Internal Energy, Enthalpy, and Heat Capacity  
4 Thermochemistry  
5 Entropy and the Second and Third Laws of Thermodynamics  
6 Chemical Equilibrium  
7 Real Gases  
8 Phase Diagrams  
9 Ideal and Real Solutions  
10 Electrolyte Solutions  
11 Electrochemical Cells, Batteries, and Fuel Cells  

**Weeks 13-15: Kinetics**  
33 Kinetic Molecular Theory of Gases  
35 Elementary Chemical Kinetics  
36 Complex Reaction Mechanisms
QUIZZES: Quizzes will be every other week starting August 26th and they will be during recitation. The quizzes will be over material pertinent to the course; including but not limited to definitions, math, calculus, and physical chemistry.

FINAL EXAM: The final exam is on Tuesday December 8th 8 am to 10:30 am.

COURSE GOALS: Students should learn the basic techniques, tools, and theories from the areas of Thermodynamics and Kinetics.

STUDENT OUTCOME OBJECTIVES:
Upon completion of this course students will:
Understand the need for the fields of Thermodynamics and Kinetics.
Derive and apply the Laws of Thermodynamics.
Derive and apply the laws governing the fundamentals of equilibrium.
Understand the Kinetic Theory of Gases.
Derive and apply equations explaining the rate of reactions.
Derive mechanisms to explain rate equations.

HOUR JUSTIFICATION: CHEM 3437/3037 is a 4 credit course which meets for 150 minutes of lecture and 180 minutes of laboratory a week for 15 weeks. At the end of the semester there is a 2.5 hour final exam. Students have significant materials to read and problem assignments that involve critical thinking and quantitative reasoning. Students are tested over the material throughout the semester and will be given a comprehensive final exam. Students should engage in a minimum of 9 hours (6 for lecture; 3 for lab) of work and study outside of classroom hours to prepare for and succeed in this course.

MAKE-UP POLICY: There will be no make-ups in this class.

ATTENDANCE POLICY: Attendance is probably the single most important study aid in physical chemistry. As such, there is an attendance policy. Excused absences must be documented. The first two unexcused absences will not count against you. Upon the third unexcused absence, each absence will result in the removal of three percentage points from your final average.

ACADEMIC HONESTY POLICY: Any student found cheating will be subject to the penalties as stated in the Student Code of Conduct handbook; including but not limited to a score of zero on exam, expulsion from the class or expulsion from the University. Use of a programmable calculator is considered cheating.

ACADEMIC DISABILITIES POLICY: Students with Disabilities—To obtain disability related accommodations and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, Room 325, 468-3004/ 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided.
FACE MASKS, COVID-19, ETC.: Masks (cloth face coverings) must be worn over the nose and mouth at all times in this class and appropriate physical distancing must be observed. Students not wearing a mask and/or not observing appropriate physical distancing will be asked to leave the class. All incidents of not wearing a mask and/or not observing appropriate physical distancing will be reported to the Office of Student Rights and Responsibilities. Students who are reported for multiple infractions of not wearing a mask and/or not observing appropriate physical distancing may be subject to disciplinary actions. **A student running a fever should attend class via Zoom and should NOT attend a face to face class.**


CLASSROOM BEHAVIOR POLICY: To ensure a classroom environment conducive to learning, any forms of classroom disruptions will not be tolerated (examples but not limited to – talking, use of cell phones/beepers, sleeping, reading other material, eating/drinking). Students who violate these rules will be asked to leave. Repeat offenders will be subject to disciplinary action in accordance with University policies as described in the Code of Student Conduct.
**Tentative Schedule of Topics (Laboratory)**

We will begin with the first three experiments (hopefully in person). Partners will be assigned. The last four experiments will be done as data collection analyzes and conclusions. I will provide you with handouts.

Experiment 6 Heats of Combustion (Bomb Calorimetry)
Experiment 13 Solid-Liquid Equilibrium in a Binary System (with modification)
Handout Kinetics

Handout Heats of Ionic Reaction
Handout Gas Thermometry
Experiment 2 Heat Capacity Ratio of Gases (with modification)
Handout Ionization Constants of Acids

Students will submit their own laboratory report. Laboratory reports will be due at the beginning of the lab. The lab will be due 9/8, 9/22, 10/6, 10/30, 10/20, 11/3, and 11/7. Late labs will be graded on a 70% scale if they are turned in the same day, and will not be accepted the next day. Your laboratory grade also depends on your laboratory techniques and etiquette.

An additional requirement in lab is that the lab remains clean. I am not your maid and will not clean up after you. **Failure to clean up your glassware and work area will result in the deduction of a minimum of 30 points from everyone’s laboratory grade.**

The format of the full lab reports will be
- Introduction
- Methods and Materials
- Results/Discussions
- Conclusion
- References (min. of 5) in Journal of Physical Chemistry Letters (JPCL) style.

The format of the other lab reports will be
- Introduction
- Discussion/Conclusion
- References (min. of 3) in Journal of Physical Chemistry Letters (JPCL) style.

Instructor reserves the right to change the syllabus at any time.