I. **Course Title**
   Physical Chemistry Lab

II. **Course Prefix/Number**
   CHEM 433

III. **Credit Hours**
   2

IV. **Prerequisites**
   Prerequisite or Co-Requisite: CHEM 431

V. **Catalog Description**
   The principles of physical chemistry applied in the laboratory. Four hours laboratory plus one hour lecture per week.

VI. **Curricular Relationships**
   Required for BA chemistry and BS chemistry, BS biochemistry, and BS chemical physics.

VII. **Student Learning Outcomes**

   - Students will be able to evaluate the reliability of data and to establish reasonable error limits on results.
   - Students will be able to keep records of all lab work in a lab notebook.
   - Students will be able to write up results in a manner appropriate for submission to a journal.
   - Students will be able to demonstrate proper use physical chemistry laboratory equipment including lasers, oscilloscopes, vacuum systems, gases, bomb calorimeters, and signal generators.
   - Students will be able to work independently.
   - Students will be able to work in a group.
VIII. **Content Outline**

Lab exercises are completed in the areas of thermodynamics and kinetics. Techniques and skills employed and/or discussed include the following:

- Treatment of data and errors
- Keeping a research-style lab notebook
- Preparing an experimental write-up for journal publication
- Handling of gases and vacuum technology
- Temperature and pressure measurements and devices.
- Use of lasers, fast oscilloscopes, and signal generators.

Currently 8 experiments are done including:

- a lab on error analysis utilizing data from measuring the speed of light.
- heat capacity ratio by two methods.
- bomb calorimetry.
- vapor pressure of a pure liquid.
- kinetics of the bromination of acetone.
- quenching of fluorescence
- 2 elective experiments chosen by the student from a list provided.

IX. **Course Procedures/Policies/Grading Scale**

- Experiments are done in rotating pairs except for the elective experiments, which are done individually.
- The eight labs, the paper and a lab final each count equally in the determination of a final grade for the course.
- Grading Scale: >87 = A; 75-86 = B; 60-74 = C; 50-59 = D; <50 = F

IX. **Required/Recommended Readings**

The typical text for this course is *Experiments in Physical Chemistry* by Shoemaker, Garland and Nibler.

XI. **Issues Unique to this Course**

None
XII. Additional Departmental Issues

None