Physical Chemistry Laboratory - Spring 2015
CHEM 417
Room CSL-222

Instructors:
Section 01: TTh 8:00-10:40; Section 02: TTh 2:00-4:40
Dr. Karen Peterson
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Office hours: T/Th 1:00-2:00 pm

Text: "Physical Chemistry Laboratory Manual"; purchase this in the SDSU booksotore
The Chem 251 text, "Quantitative Chemical Analysis", 6th, 7th or 8th edition, by Daniel C. Harris, is strongly recommended. The following chapters will be useful.
Chapters 1 - 5: Introductory laboratory methods.
Chapter 8: Activity
Chapter 18 - 20: Spectrophotometry
Required Lab Notebook: You will need a lab notebook with duplicate pages. This is available in the bookstore. The lab notebook will remain in the lab at all times.

Catalog Description
CHEM 417. Advanced Physical Chemistry Laboratory
Six hours of laboratory.
Prerequisites: Chemistry 251, 410A, and credit or concurrent registration in Chemistry 410B
Experimental physical chemistry. Emphasis on interpretation and statistical evaluation of instrument-derived results, recor keeping, report writing and individual initiative in observing results.

PROJECTS AND ASSIGNMENTS (700 total possible points):

This course focuses on quantitatively measuring the physical and chemical properties of compounds and understanding the limits of accuracy and precision in these measurements. There is also a strong writing component, with regard to both the laboratory notebook and written reports. There will be seven lab projects and two assignments. The following point distribution applies to each lab project:

Prelab quiz: A quiz will be given at the beginning of lab on the first day of each project.
10 pts More details will be given in class.

Notebook: Requirements and expectations for the Lab Manual are given at the beginning of
20 pts the lab manual.

Report: **50-60 pts** The lab reports must be typed, with figures and tables imbedded. The manual contains more details about how to write the report. In general, each report contains Introduction, Experimental Procedure, Results, and Discussion sections as well as any appendices that are needed. In the first three reports, the Introduction and Experimental Procedure will be omitted.
Send the reports electronically to Dr. Peterson: kpeterson@mail.sdsu.edu,

Lab performance: **10 pts** We are expecting you to be punctual (see below), prepared (see prelab), willing to learn, serious about doing well on the projects, and considerate of labmates. Also, we expect you to do careful labwork which leads to reasonable results.

The first three lab projects (without the introduction and experimental sections) are worth 90 points. The last four lab projects are worth 100 points.

Lab Reports

There will be seven project reports required. The first three will not include the Introduction and Experimental Procedure so that you can focus on the Results and Discussion. After the first project, a day in the computer lab will be set aside for learning how to present results. After the fourth project, as day in the computer lab will be set aside for working on the Introduction and Experimental Procedure. These computer lab sessions are required and points will be subtracted if you do not attend.

1 point for each day late will be subtracted for reports submitted after the deadline. These points cannot be made up.

Other Assignments:

10 points – Lab demonstrations and practices. 2nd lab period.

20 points – Enthalpy and entropy of keto-enol tautomerization
After everyone has finished the NMR lab, the temperature-dependent equilibrium constants for the tautomerization of acetylacetone will be collected and you will use the data to determine the enthalpy and entropy of tautomerization (in GMCS-245A on the last day of lab).

Attendance and Punctuality

Attendance is mandatory: 10 points will be subtracted if you miss a class, unless you are completely finished with the lab work and the analysis of the data. The only exception is the fourth day of class for Projects 6 and 7. Although you will be able to use your partner's data for any missed days, you will need to do a make-up lab to get those 10 points back. This involves a trial lab of the instructors choice which will take no more than a total of three hours. Only one lab can be made up in this way.

If you are late to lab by more than 5 minutes, 5 points will be deducted; more than 5 points may be deducted for egregious violation of punctuality. Late points cannot be made up.

The grading scheme for the course will be as follows:

A	89-100%	C	59-66%
A-	85-89%	C-	55-59%
B+	81-85%	D+	51-55%
B	74-81%	D	43-51%
B-	70-74%	D-	40-43%
C+	66-70%	F	< 40%

Total points = 700

List of Projects

- Bimolecular Quenching Kinetics
- Determining the Critical Micelle Concentration (CMC) of Sodium Dodecyl Sulfate
- Solution Properties Determined by Surface Tension Measurments
- Prediction and Measurement of Infrared and Raman Spectroscopy
- Kinetics of the Oxidation of Erythrosin B
- Investigation of Enol-Keto Tautomerism using NMR spectroscopy
- Interpretation of the Visible Spectra of Polymethine Dyes

LEARNING OUTCOMES

At the end of this course, we expect that you will have learned the following:

- How to write clear and concise reports, including the preparation of tables and graphs
- Be able to record results and observations in a notebook in a complete and clear manner
- Be able to clearly present numerical results and estimate uncertainties in those results
- Develop a working knowledge of a variety of spectrometers (e.g., NMR, IR, Raman, Fluorescence)
- Be able to analyze raw data to determine specific properties of compounds and molecules

Add/Drop Procedure: The add/drop deadline is Feb. 3, 2014. For details, see http://arweb.sdsu.edu/es/registrar/schedule_adjustment.html

Students with Disabilities:
If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Disability Services. Your cooperation is appreciated.

CHEM 417 Course Schedule Spring 2015

Date	Tuesday	Thursday
Week #1 Jan 19 – 23	Classes start on Wed., Jan. 21	Introduction
Week #2 Jan 26 – 30	Lab demonstrations and practices. Meet in CSL-222	Project #1
Week #3 Feb 2 – Feb 6	Project #1	Project #1
Week #4 Feb 9 – 13	**Report writing Proj #1, GMCS-245A**	Project #2
Week #5 Feb 16 – 20	Project #2 **Project #1 report due**	Project #2
Week #6 Feb 23 – 27	Project #3	Project #3 **Project #2 report due**
Week #7 Mar 2 – 6	Project #3	Project #4
Week #8 Mar 9 – 13	Project #4 **Project #3 report due**	Project #4
Week #9 Mar 16 – 20	**Report writing Proj #4, GMCS-245A**	Project #5
Week #10 Mar 23 – 27	Project #5 **Project #4 report due**	Project #5
Mar 30 – Apr 3	SPRING BREAK	SPRING BREAK
Week #11 Apr 6 – 10	Project #6 **Project #5 report due**	Project #6
Week #12 Apr 13 – 17	Project #6	Project #6
Week #13 Apr 20 – 24	Project #7	Project #7 **Project #6 report due**
Week #14 Apr 27 – May 1	Project #7	Project #7
Week #15 May 4 – May 8	**Assignment, in GMCS-245A** "Enthalpy and entropy of the keto-enol tautomerization"	**Project #7 report due**
Week #16 May 11 – 15	All reports are due on May 12	May 7 is the last day of classes

Feb. 10 and Mar. 17 – We will be meeting in the computer room to write reports. All of the report except for the discussion must be submitted at the end of that period. The discussion section must be submitted before the following lab period. We will also use the computer room on May 5 to do the assignment: "Enthalpy and entropy of the keto-enol tautomerization"