COURSE PLAN FOR PHYSICAL CHEMISTRY LABORATORY
Spring 2010

CHEM3030LB: 1 Credit Hour

Section	Day	Time	Classroom	Instructor
01	Monday	2:00-4:50 PM	36-310	Dr. Kolesnichenko
03	Tuesday	1:15-4:05 PM	36-310	Dr. Zhang
04	Wednesday	2:00-4:50 PM	36-310	Dr. Zhang
05	Thursday	1:15-4:05 PM	36-310	Dr. Zhang
02	Friday	2.00-4.50 PM	36-310	Dr. Kolesnichenko

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Office: 37-340; Phone, 7372; Office Hours: MWF 11AM-1PM
Dr. Vladimir Kolesnichenko: vkolesni@xula.edu,
Office: 36-301F; Phone, 5430; Office hours: M 10.50-11.50; W 11.00-12.30;
R 10.00-11.00 and 13.30-15.30

Course Description

A selection of experiments featuring the applications of principles of physical chemistry. Experiments include the use of physical chemistry techniques to examine the properties of solids, liquids and gases, and the study of reaction kinetics. The course requires extensive computational and writing skills. Prerequisite, CHEM3210/3210LB; Co-requisite, CHEM3010/3030.

Required Texts and Other Materials

1. A.M. Halpern and G.C. McBane, *Experimental Physical Chemistry*, 3th Edition, W.H. Freeman and Company, 2006.
2. Jian Zhang and Vladimir Kolesnichenko, *Physical Chemistry Laboratory Manual, a Supplement to Experimental Physical Chemistry*, Edition 2, Spring 2010.
3. Laboratory Notebook, Xavier University Chemistry Department.
4. Goggles and lab coat.

Course Objectives

Upon the successful completion of this course, the students should be able to

- apply the physical chemistry principles to the practical laboratory experiments,
- perform the accurate and quantitative physical measurements,
- analyze data statistically and assess reliability of the results,
- interpret the experimental results and draw the reasonable conclusions, and
- communicate effectively through oral and written reports.

Course Requirements

1. All students are required to check in each class by scanning ID in the classroom card reader. In the event of an excused absence, a student is responsible for having the missed experiment made up as soon as possible in another section with the instructor's permission.
2. Students are expected to come to the lab on time and in full preparation for the scheduled experiment, and to stay in the lab until the data collection is completed.

3. A 10-pt quiz for the scheduled experiment is to be given at the beginning of each lab period. No make-up quiz will be given if it is missed.
4. Each student is required to keep a bound lab notebook. Students should prepare the notebook with title, date, objective(s), and brief procedures in advance, which will be initialed by the instructor before starting the experiment. Three points will be deducted if the student fails to do so. A carbon copy must be turned in at the end of the experiment.
5. A lab report must be written for each experiment. *The report must be an independent work. Only the hard copy is accepted. The xerox copy of any part of the report is not accepted*. All reports are due one week after the completion of the respective experiments unless otherwise announced. *Late reports including project will be penalized at 2 points per workday for up to 3 weeks.* ***The reports over 3 weeks late will receive a grade of zero.*** *Early reports will be credited at 2 points per workday for up to one week.*
6. The lab performance grade includes factors such as: being on time for class, wearing safety goggles, taking safety precaution, and cleaning up work space.
7. An oral presentation on an assinged topic is required. A comprehensive final examination will be given at the end of the semester.

Course Evaluation

Computer project	30	90-100%	A
Quizzes 6@10	60	80-89%	B
Notebook 6@10	60	70-79%	C
Lab performance 6@5	30	60-69%	D
Lab reports 6@50	300	<60%	F
Oral report	50		
Final examination	100		
Total points	630		

Academic Integrity

The following is quoted from the Xavier University Faculty Handbook:

"If a student's test, examination paper, laboratory report, term paper, or other written assignment gives evidence of not being completely his/her own work, he/she may be given an F for the course. A student who communicates with anyone during the course of an examination or test, unless with the permission of the instructor, may be immediately dismissed from the room and given an F. Such communication includes attempt to read from another's paper. If a student is found to have brought study materials into the examination room without the instructor's permission, it may be assumed that he/she intended to use such materials unlawfully, and he/she may be penalized accordingly."

Further comments regarding academic misconduct in writing lab reports and project report are as follows.

- ***Copying any part of the report from the lab partner, or any other sources is plagiarism. In cases where such is detected, all students involved will receive a grade of zero for the report***
- ***It is never acceptable to falsify experimental data. Any lab reports with the data not taken in the scheduled time by the student will receive a grade of zero.***
- ***It is also considered cheating for a student to use somebody else's electronic file as a template to write the report, or for two students to collaborate on the same report.***

Schedule:

Two expeiments will be going on in each lab period due to the limited equipment. Two students will work together in the lab each time. The detailed schedule will be anounced by the instructor. Each student will write 3 complete lab reports, and 3 short reports which does not include introduction. The instructor will assign each student either complete report or short report for each experiment in class.

WEEKS	M	T	W	R	F
1/11-1/15	Introduction	Introduction	Introduction	Introduction	Introduction
1/18-1/22	MLK Day	Lecture I	Lecture I	Lecture I	Lecture I
1/25-1/29	Lecture I	Lab 1	Lab 1	Lab 1	Lab 1
2/1-2/5	Lab 1	Lab 2	Lab 2	Lab 2	Lab 2
2/8-2/12	Lab 2	Lecture II	Lecture II	Lecure II	Lecure II
2/15-2/19	Mardi Gras	Mardi Gras	Lab 3	Lab 3	Lab 3
2/22-2/26	Lecture II	Lab 3	Lab 4	Lab 4	Lab 4
3/1-3/5	Lab 3	Lab 4	Lecture III	Lecture III	Lecture III
3/8-3/12	Lab 4	Lecture III	Lab 5	Lab 5	Lab 5
3/15-3/19	Lecture III	Lab 5	Lab 6	Lab 6	Lab 6
3/22-3/26	Lab 5	Lab 6	Review	Review	Review
3/29-4/2	Easter	Easter	Easter	Easter	Easter
4/5-4/9	Lab 6	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation
4/12-4/16	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation
4/19-4/23	Oral Presentation	Final Exam	Final Exam	Final Exam	Final Exam
4/26-4/27	Final Exam				

Experiments to be performed in this course

Contents in the lab manual	Respective contents in the lab textbook
Introduction: writing a pchem lab report, Data analysis using a spreadsheet, physical measurements in the pchem laboratory.	Chap 1. Working with experimental data Chap 2. Data analysis in the pchem lab. Chap 3. Temperature, pressure, and voltage measurements
Exp 1. The effect of temp on equilibrium	Exp 24. Kinetics and thermodynamics of a heterogeneous gas phase reaction
Exp 2. Vapor pressure of a pure liquid	Exp 11. The vapor pressure and heat of vaporization of liquids
Exp 3. Bomb calorimetry	Exp 5. Bomb calorimetry
Exp 4. Heat capacity ratio of gases	Exp 2. Heat capacity ratio of gases
Exp 5. Thermodynamics of an electrochemical cell	Exp 8. Thermodynamics of an electrochemical cell
Exp 6. Kinetics	Exp 25. Kinetics and mechanism of a heterogeneous reaction