Fairleigh Dickinson University
Metropolitan Campus

Syllabus for Physical Chemistry I (Laboratory)
Fall 2015

Course Title: Physical Chemistry I Credits: 2 credits
Course Number: CHEM 3243.51 and CHEM 3243.52
Time: Monday 5:25 PM – 8:50 PM, Wednesday (12:00 PM – 3:30 PM)
Room(s): DH 5519, DH 5503,
Some experiments will be done in the computer lab. (Room: DH-5519)
Instructor: Dr. Arthur R. Murphy
Office: DH 4413 Office Hours: M & F 11:00 AM – 11:50 AM
F 12:30 PM – 1:30 PM and by appointment
Telephone: (201)-692-2322
e-mail murphy@fdu.edu

Required Text: Physical Chemistry I Laboratory Manual- Fall 2015, Dr. A. Murphy

Catalog Description: Physical Chemistry Laboratory I
Laboratory experiments demonstrating fundamental laws, concepts and mathematically derived relationships involving selected physico-chemical properties of matter and energy. Corequisite: CHEM 3241.

Policies and Procedures:
1) All cell phones, beepers, and pagers must be turned off during lecture.
2) Students are expected to arrive for lab on time so as not to disrupt the proceedings.
3) Late Lab reports will not be accepted. Lab reports are usually due two weeks after an experiment is concluded. Any exceptions to this rule will be stated in due course.
4) All safety procedures must be followed exactly. Details regarding safety will be discussed during the first lab period. No student will be permitted into laboratories wearing shorts, halter-tops, open toed sandals, undershirts, tank tops or any other inappropriate attire. All students must purchase a white laboratory coat that can be used for any Biology or Chemistry class that requires a lab. This rule applies to everyone taking the lab.
5) In addition to performing the experiments, students will be expected to become proficient in the use of scientific software packages (e.g. Mathcad)
6) Last Day for dropping the course with a grade of "W" is November 3rd.

Grading Policy: Lab Reports: 100%
The exact lab report format to be followed will be discussed during the first lab period. Lab reports will be graded on the basis of neatness, thoroughness, adherence to the required lab report format, and experimental accuracy and precision. A thorough discussion of errors must accompany each lab report.
Introduction:
The Physical Chemistry I Laboratory experiments are chosen so as to reinforced, augment, and amplify the material that is discussed in the Physical Chemistry I lecture course. Experiments involving computers, simulations, gases, thermodynamics, surfaces, and transport properties will be explored.

Course Objectives and Outcomes:

Objective 1: To promote proper laboratory practices and report preparation

Outcome 1.1: Know location of safety equipment, and be familiar with emergency procedures. Become aware of proper laboratory attire, and understand laboratory etiquette.

Outcome 1.2: Understand proper laboratory report format to be used, and grading criteria to be employed.

Outcome 1.3: Use Microcomputers to assist in report preparation.

Outcome 1.4: Learn/Review limitations associated with data and experimental uncertainties are handled.

Objective 2: Become proficient at handling chemicals and using laboratory equipment.

Outcome 2.1: Be trained in handling of various chemicals.

Outcome 2.2: Be trained in proper use of equipment found in standard Physical Chemistry Laboratories: analytical balances, heating units, accurate thermometers, viscometers, tensiometers, etc.

Outcomes assessment:

Students who have successfully completed this course should have reinforced their knowledge of the material covered in the Physical Chemistry I (Lecture Course). Specifically, students should have an understanding of ideal, real gases, and the kinetic theory of gases as well as an understanding of various aspects of applied thermodynamics and some transport properties. These topics are all fundamental, and they should serve as a basis for taking additional chemistry courses such as Physical Chemistry II, Inorganic Chemistry, Biochemistry etc.

Core Competencies

As part of FDU’s “Writing Across the Curriculum” initiative, all students will be required to write formal laboratory reports. Standard English and standard grammar must be employed. Students should use computers (Word Processors, Spreadsheets, MathCad) as much as possible to prepare reports, graphs etc.
**Teaching Methodologies / Activities**

Laboratory experimentation is, by its nature, a hands-on activity requiring a structured approach to the exploration and analysis of various scientific problems. Students should learn to appreciate how meaningful answers are obtained to these problems. Laboratory experimentation requires that the student pay attention to detail, have the ability to carry out multi-step procedures so as to acquire meaningful data, and also to have the ability to analyze the experimental results by a variety of means. All of these are important attributes in many fields.

In addition to supervising the performance of experiments, your Instructor will use computer and web resources where applicable.

**TENTATIVE LABORATORY SCHEDULE**

A week by week Laboratory Schedule along with information indicating which students will be performing a specific experiment will be distributed during the first two weeks of the semester.

Typical Experiments are shown below.

**Physical Chemistry I Set I Experiments**

The first three or four laboratory sessions will be held in one of the University’s computer laboratories and will be devoted to

Experiment #1 An Introductions to MathCad + Mathcad Exercises (1 ½ - 2 weeks)
Experiment #2 Exploration of Real Gases. Mathcad projects (1 ½ - 2 weeks)

**Physical Chemistry I Set II Experiments**

Experiment #3 Kinetic Theory of Gases Simulations (1 ½ - 2 weeks)
Experiment #4 \( C_p/C_v \) Rückhardt's Method
Experiment #5 \( C_p/C_v \) Clement-Desormes Method

**Physical Chemistry I Set III Experiments**

Experiment #6 Measurement of Viscosity
Experiment #7 Measurement of Surface Tension (Capillary Method)
Experiment #8 Measurement of Surface Tension (Ring Method)
Experiment #9 Conventional Entropies aka Absolute Entropies (A computer Exercise)
Experiment #10 Measurements of Heats of Solution
Experiment #11 Determination of Partial Molar Volumes

If time permits, experiments involving the determination of an equilibrium constant, the
calculations of fugacities, or the determination of activity coefficients could be done, but most likely these experiments will be performed in the Physical Chemistry II laboratory.

**General Remarks:**

1) The last day to withdraw from class with a grade of “W” is October 31, 2015.

2) Sharing of computer files or copying lab reports in part or in full will result in an automatic grade of “zero”. Don’t even think about doing this!!

3) Lab reports are due two weeks after the experiment was performed in the lab. Any exceptions to this policy will be discussed in class.

4) Below you will find URL’s for FDU’s Academic Integrity policy as well as FDU’s Accommodations Policy for students with learning disabilities, or requiring assistance.

**Academic Integrity Policy**

http://view2.fdu.edu/academics/university-college/school-of-humanities/writing-program-guide/academic-integrity-policy/

**Reasonable accommodations Policy**

http://view2.fdu.edu/metropolitan-campus/disability-support-services/