

**General Chemistry Laboratories for Honors (Chem 124 Honors)  
Spring 2017, Syllabus**

**Instructor:** Dr. Pin Gu

**Office:** Tiernan 210

**Office Hours:** Friday 1:30 PM – 3:30 PM or by appointment

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**Manual:** “General Chemistry Laboratory Experiments (Experimental Procedures for Chem 124 Honors)” by R.W. Kluiber, Edgardo Farinas and Somenath Mitra.

*Course Description*

This laboratory course is designed to give chemistry laboratory learning and research experience for Honors students, students who expect to major in chemistry or a related discipline (physics, mathematics, etc.) and/or students with strong background and interest in science. Some experiments in the course are designed to provide students with practical experience and basic techniques in the chemistry laboratory. Others will introduce honors students to the field of biochemistry and biotechnology. Our goal is to provide a logical framework for training students in how to approach research problems and conduct and evaluate scientific research. These experiments provide extensive background on the principles underlying methods used in research, followed by experiments designed to illustrate those principles.

This course is required to be taken concurrently with Chem 126 Honors. Two days will be scheduled for each week with six sections. Students are allowed to switch among sections. This means that students have added freedom via a choice of attending lab and completing experiments at any section. The students must read the course manual and complete the pre-lab quiz (there are no prelab quizzes for Green Chemistry: Microwave Induced Reactions, Gel Filtration Chromatography, and Colorimetric Methods for Quantification of Proteins) prior to beginning each experiment. Instructions are in the lab manual and concepts are from the text and lecture of the Chem 126 Honors lecture course and your Chem I / II Text.

**Lab hours for the Spring 2017 semester are as follows:**

**Tuesday:**                10 AM – 1 PM;        1 PM – 4 PM;    5 PM – 8 PM

**Thursday:**             8:30 AM – 11:30 AM

*Attendance*

- Attendance is mandatory. You must attend one section of lab each week.
- Students should sign the attendance sheet each week when arriving in lab.
- All experiments must be completed during the same lab period. In other words, you may not begin an experiment and complete it on the following day or any other time period.
- The last week of the semester will be reserved for students to make-up labs which were missed. At this time, students will be permitted to make-up **two experiments only**. **(You will not be able to make up “Gel Filtration Chromatography” and “Colorimetric Methods for Quantification of Proteins” labs.)**

### *Prelab Quizzes*

- For each experiment (except for Gel Filtration Chromatography and Colorimetric Methods for Quantification of Proteins), students must pass a prelab quiz prior to beginning the experiment. **Students cannot begin an experiment until they have completed and passed the prelab quiz.**
- The completed prelab quiz accounts for 10 % of each lab grade.

### *Lab Reports*

- A lab report will be handed in for each experiment. The report consists of the completed data sheet found in your lab manual, plus a separate page containing your calculations.
- A complete lab report including Title, Introduction, Materials and Methods, Results, and Discussion is required for two labs, Gel Filtration Chromatography and Colorimetric Methods for Quantification of Proteins.
- For most experiments, lab reports must be handed in immediately following completion of the lab. For these experiments, **late lab reports will not be accepted.** For the final 3 experiments of the semester and the two labs mentioned above, students will be given one week to complete the report. Any reports turned in late will lose 10 points per week.

### *Working in Groups*

- Students may perform experiments with **one or two** other persons. Any students found working in a group larger than **three** will receive a **zero** for that lab grade.
- Students working in pairs must arrive at lab and begin the experiment **at the same time.** Both students must remain in lab until the experiment is completed and the lab reports have been handed in.
- Students working in pairs can perform the experiment together and work on calculations together, but each student must hand in a separate lab report, which includes data and calculations which are their own work.

### *Grades*

- Grades for the class will be determined solely upon the grades received on lab reports. Your grade will be simply calculated from the average of your 10 lab report grades.
- Remember, the completion of the prelab quiz is a part of your lab report grade. Each quiz is worth 10 points out of the total 100 points for each lab report. Failure to complete prelab quizzes is likely to affect your overall grade significantly.

### **Required Materials**

- Lab manual (available at NJIT bookstore).
- Safety goggles (available at the NJIT Bookstore or Homedepot).

- Disposable nitrile gloves (available at amazon.com or Homedepot).
- Disposable lab coat (color in white, available at amazon.com).
- Each lab group will be required to purchase a lock for the equipment locker.

### **Safety Rules**

- WEAR SAFETY GOGGLES AT ALL TIMES IN THE LABORATORY.
- Clothing that covers your legs and shoulders are required. No shorts or short skirts.
- Everyone will be required to wear lab coats and gloves during each experiment.
- Closed shoes must be worn at all times. No sandals.
- Food or drink is not allowed in the lab.
- Turn off cell phones. Texting is not permitted in the lab.
- Properly dispose of waste materials.
- Cleanup your workspace and wash your hands prior to leaving the laboratory.

### ***Laboratory Schedule for Spring 2017***

Below is a tentative weekly schedule. I will try to stick to this schedule as closely as possible. Students will be consulted with to reach an agreement on any modifications or deviations from the syllabus throughout the course of the semester.

| Week | Date        | Experiment  |
|------|-------------|---|
| 1    | 1/24 & 1/26 | Check in, Introduction, and Safety                            |
| 2    | 1/31 & 2/2  | Measuring the Density of a Solid and a liquid                 |
| 3    | 2/7 & 2/9   | Gel Filtration Chromatography **                              |
| 4    | 2/14 & 2/16 | Colorimetric Methods for Quantification of Proteins **        |
| 5    | 2/21 & 2/23 | The Solvay Process  |
| 6    | 2/28 & 3/2  | Paper Chromatography and Completion of the Solvay Process Lab |
| 7    | 3/7 & 3/9   | Calorimetry: Experiment Based on Thermodynamics               |
| 8    | 3/14 & 3/16 | Spring break recess   |

|    |             |  |
|----|-------------|--|
| 9  | 3/21 & 3/23 | Analysis of Acidic Substances by Titration       |
| 10 | 3/28 & 3/30 | Kinetics: the Clock Reaction                     |
| 11 | 4/4 & 4/6   | Spectrometric Analysis for Phosphate             |
| 12 | 4/11 & 4/13 | pH, Buffers and the Dissociation Constant, $K_a$ |
| 13 | 4/18 & 4/20 | Make ups and Check out                           |

**\*\* You will not be able to make up “Gel Filtration Chromatography” and “Colorimetric Methods for Quantification of Proteins” labs.**

### *Learning Outcomes*

- Comply with safety rules when working in chemistry laboratory.
- Demonstrate the ability to use general chemistry laboratory equipment.
- Demonstrate the ability to follow lab manual instructions to perform chemistry experiments.
- Demonstrate the ability to use the knowledge of General Chemistry principles to solve the problem.
- Develop practices in recording experimental procedures and data.

### *NJIT Honor Code*

The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. Please carefully read the honor code at <http://www.njit.edu/academics/honorcode.php>.