

**Department of Chemistry
New York University
Fall 2016**

**Laboratory
CHEM-UA127
(Advanced General Chemistry I course)**

The laboratory component is an integral part of the CHEM-UA 127 course. The laboratory grade will constitute 25% of your total score in the course. We will meet once a week on Thursdays between 2:30 pm and 6:45 pm in room 455 Brown. At 2:30 pm we will start with a discussion, comments, questions, etc., about the current experiment. This will be followed by a ten minutes quiz related to the experiment.

INSTRUCTORS FOR THE LABORATORY COMPONENT:

Instructor:

Dr. Margaret (Malgorzata) Mandziuk
Office: 1001W Silver
Office Hours: Tuesday 3 – 4 pm, Wednesday 6 – 7 pm, and by appointment
e-mail: margaret.mandziuk@nyu.edu

Laboratory Instructors:

Dr. Margaret Mandziuk (see above for office hours)
Mr. TBA

TEXT:

Handouts with descriptions of the experiments and the assignments will be available for download from the NYU CLASSES. [To access NYU CLASSES of our laboratory sections go to your Home Page. Select the ACADEMICS tab. The list of NYU CLASSES-enabled courses (with section numbers) will be on your screen. The site, Advanced General Chemistry, Section 201, will contain information related to the laboratory part of the course. The descriptions of the experiments will be available in the Resources folder.]

(TENTATIVE) SCHEDULE OF THE EXPERIMENTS :

Week Dates	Experiment
1 Sept. 8	Check-In and Safety Information
2 Sept. 15	Density of Glass Spheres - Error Analysis
3 Sept. 22	Titration Challenge
4 Sept. 29	VSEPR with CCDC
5 Oct. 6	Critical Micelle Concentration
6 Oct. 13	Line Spectra of Atoms
7 Oct. 20	Quantum Dots Size from their Spectrum
8 Oct. 27	Spartan Simulations I: Operating the Software; Diatomics
9 Nov. 3	Spartan Simulations II: MO of Polyatomic Species
10 Nov. 10	Separation of Organic Compounds with Gas Chromatography
11 Nov. 17	Light and Color: UV-Vis Spectra of Solution
12 Nov. 24	<i>Thanksgiving (no lab)</i>
13 Dec. 1	Application of Beer's Law: Job Method
14 Dec. 8	X-ray Diffraction/Packing Efficiency of spheres
15 Dec. 15	Check-Out*

*Students who do not check out will receive a grade of incomplete (I).

Lab Objectives:

Our great-grandparents had to know chemistry in order to survive; they had to know how to preserve food for winter, how to analyze the quality of food or, for example, how to clean different kinds of stains. They knew the appropriate methods and chemicals to use. These days we have others thinking for us and making our life comfortable. We can buy a detergent, yet we are unaware of what is its content and how its components work, or what the environmental consequences of using it are.

One of the objectives of a chemistry lab is to provide you with the experience that will let you develop chemical intuition. Let's be frank - a few hours a week in the lab will not be enough to make you a chemist. However, it will prepare you well for a further and deeper understanding of chemistry.

These days we can access any kind of information on-line. You could possibly try to develop chemical intuition by watching movies on U-Tube. Do you think this would give you the same experience as a hands-on experiment? Would you learn to think about experiments and figure out how to avoid possible experimental errors? Will it really prepare you to make new materials or pharmaceuticals? Will you be able to think about chemical reactions that occur in the body of your patient who ingested a newly prescribed drug? I don't think so! Hands-on experience can't be replaced!

We will use computers for gathering experimental data. You will still work with chemicals and laboratory equipment. The computers will simply record data and allow you to examine it faster, providing you with functionalities such as automatic graphing, curve fitting, or interpolating. This approach will facilitate more pleasant and effective learning of chemistry. We will also use computers to grasp a taste of the "new" chemistry branch – computational chemistry.

It is assumed that you have an excellent knowledge of high school chemistry. Therefore, in this course the basic concepts, such as moles or stoichiometry, will be only refreshed and enriched, rather than introduced (remember that these concepts are used in nearly every chemistry experiment). Some of the experiments will illustrate concepts presented in the lecture part of the course. Other experiments will give you a chance to develop more rigorous analytical skills by introducing you to more advanced techniques of analytical chemistry. In some other experiments you will be exposed to the forefront of today's research. Well, we will not yet use research-quality lab equipment. However, you will be surprised how much we can learn using simple apparatus that has been available to scientists for many years.

Logistics:

- In the lab you will work with a partner or sometimes with a larger group.
- Glassware and other laboratory equipment will be available free for you to use. However, every damaged, broken piece of the equipment must be replaced. You will use Campus Cash on your NYU ID card to purchase the replacements.
- You should buy a binder in which you will keep handouts, lab reports, etc., (12 experiments + safety) for the semester. It is not necessary to bring the whole binder to the lab each time. However, you may be asked to show some of your notes or graded lab reports to the instructor, later on during the semester.
- Preparation for the lab:
 - Read the handout with the description of the experiment.
 - Complete the pre-lab assignment.
 - If you are having problems, talk to one of the instructors *in advance*.
 - A completed PRELAB assignment for each experiment must be handed in at the beginning of the laboratory period for that lab. Otherwise, students will be not permitted to work in the lab (they will receive grade 0 for the lab).

- During the laboratory time you will collect data, observe physical and chemical changes, make predictions, record results of your experimentation. Everything must be recorded in your electronic journal - you will have an access to a Microsoft Word or a WordPad. After finishing each experiment you must print a copy of your lab notes (with your collected data and/or graphs) and hand it to the instructor before leaving the lab. In addition to your measurement records and observations, your notes should identify the computer you used (i.e., record the computer number) and any other equipment that you used in a given experiment.
- A handout about preparation of a lab report and grading will be distributed and discussed during the first meeting in the laboratory.

Items you must have in the lab:

- Safety goggles (available at the NYU Bookstore)
- Rubber gloves (boxes with disposable non-latex gloves should be purchased from the stockroom)
- Proper attire (specified during the first lab period)
- Disposable lab-coat (A set of disposable lab-coats should be purchased from the stockroom. A used lab-coat must be discarded into a special container before you leave the lab).
- Calculator
- Pen or pencil
- The current experiment's procedure and post-lab questions/assignments
- Campus Cash on your NYU ID (you must have a Campus Cash account to pay for laboratory glassware and equipment broken during the course of the semester; cash is not accepted in the stockroom)

Items prohibited in the lab:

- Book, bags, backpacks, purses, etc.,
- Coats, jackets, outer clothing

These items are not to be brought into the laboratory after the first week. The lab bench is just for experimental equipment (that includes lab computers and calculators, but not your phones or other electronic devices). Any item left on the floor constitutes a potential hazard. If you need a sweater or a sweatshirt you must wear it - it can't be placed anywhere in the lab. Failure to adhere to these rules will result in a deduction of points from your lab score or even expelling from the lab.

On the last page of this syllabus you will find the instructions on how to use the 4th floor lockers to store your belongings during the laboratory period. There is also a little tear-off card with the instructions to keep in your wallet.

<h3>Environmentally-friendly behavior in the lab:</h3>

In an effort to minimize costs and to reduce negative effects on the environment, all of us will make a concerted effort to avoid wasting laboratory materials and to dispose of all products properly. With this in mind you must observe the following rules in the lab:

- When you obtain a reagent for use in an experiment, *read* the label on the bottle; *make sure* that the *substance* name, its *chemical formula*, and its *concentration* match those specified in the directions for the experiment.
- Take only the amount that you need (but DO NOT RETURN any reagent to the bottle - this is a basic laboratory rule!).
- Become familiar with the disposal procedure before every experiment. Dispose of all waste materials in the proper waste container (again, read the labels). NOTHING WILL GO INTO THE SINKS but water and soap. RUBBER GLOVES, DISPOSABLE PIPETS, and (of course) BROKEN GLASS MUST be disposed of in the "Broken Glass" container (not the regular trash).

Safety:

SAFETY IS OF PARAMOUNT IMPORTANCE IN THE LABORATORY.

In an effort to minimize injuries, we are going to be fanatical about safety. You will be given a list of safety guidelines and you will be given a tour of the emergency equipment in the laboratory on your first day in the lab. Take this information seriously; the chemistry lab *can* be a dangerous place if anyone ignores the safety rules. If you see someone acting in an unsafe manner, notify your instructor. If you see an emergency situation, act promptly in the fashion that we describe during the safety tour.

- **You must read and sign the Safety Agreement on the first day in the laboratory.**
- **If you do any unauthorized experimentation, you will receive a failing grade for the course!**
- **You must wear safety goggles at all times in the laboratory!**
- **Failure to follow the rules will result in expulsion from the laboratory and loss of credit for the experiment.**

If you are injured in the laboratory, report it to your instructor immediately, no matter how trivial you feel the injury to be. Instructors or guards will escort you to the Health Services (726 Broadway, 3rd Floor). You will be excused from any work that you miss. The presence of toxic substances makes it necessary to get medical attention for even a small scrape or burn. Cooperate with the instructor on this since it is for your benefit.

In case of any type of an alarm you must turn off all gas burners (if in use) and leave the laboratory immediately. The fire escape route will be shown to you during the first laboratory period. If you detect any unusual smell, notify your instructor immediately.

Academic integrity:

Copying (cheating) is not permitted and will result in a zero for the laboratory grade that week. You are permitted and encouraged to study and work with your fellow classmates. However, the instructors will give a grade of zero for assignment found to be identical to that of another student, whether the material was given or copied. For further consequences of dishonesty check the main course syllabus.

Grading of the laboratory component:

THERE WILL BE NO MAKEUP LABS. If you are too ill to work, see a doctor or go to NYU *Health Services* and bring us documentation that will verify your illness. The documentation must be on a physician's stationery and we may call for verification. Excused labs will not count when we calculate your average. You will fail the laboratory part of the course, however, if you miss more than three laboratory periods.

Your lowest grade for a lab report, or a prelab, or a quiz, will be dropped in calculating the average of your scores. The final lab-grade will include:

- | | |
|-------------------------|------|
| ▪ Quizzes (average) | 15 % |
| ▪ Prelabs (average) | 15 % |
| ▪ Lab reports (average) | 70 % |

Lockers for storage of your belongings that are not permitted in the lab

For storage of all of your belongings that are not permitted during in the lab you will use lockers on the 4th floor of the Silver building. The lockers are located along the main corridor on the floor as well as in the smaller corridor branches. You can use these lockers only during your laboratory period. The lockers stay locked for five hours only, so you must retrieve your belongings as soon as possible after the lab period, in order to avoid the risk of losing them and to free the locker for the next user.

To store your belongings:

- Choose an empty locker (remember its number).
- Make sure it closes easily.
- Put your belongings into the locker. **Do not leave your ID card in the locker – you must have it with you in the lab.**
- Close the door (make sure that nothing is stacked in between the door and the frame of the locker).
- Make sure that the handle of the locker is not stuck.
- Punch in letter **C** and a sequence of four digits on the keypad. Finish by punching the “lock” key. You should hear one beep – this is a signal that the locker is locked. The four-digit sequence is your own code (we call it *combination*) to secure the locker. **You must remember it!**
- Make sure that your locker is locked.
- **Remember (record?) the locker number and your four-digit combination!**

To retrieve your belongings:

- Find your locker.
- Punch in letter **C** and your *combination* followed by the “lock” key. You should hear two beeps – that is a (good) signal that the locker is unlocked.
- Open the locker and remove all of your belongings.
- Do not lock an empty locker – the lockers must be available for the next lab period.



The lockers are available on the 4th floor of the Silver building.

To lock the locker:

on the keypad of the locker punch in letter **C** and a sequence of four digits (your combination) followed by the “lock” key.

To unlock the locker:

Punch in letter **C** and your combination, followed by the “lock” key.