New York University
Department of Chemistry
CHEM-UA.126 General Chemistry II Laboratory Fall 2019

Instructor: Prof. Richard Orr  Office: 1001V Silver  Hours: Wed: 11am – 3pm And By Appointment

Textbook:  
*Experiments in General Chemistry, Part II, 3rd Edition*  
Author: Barry Rugg & Victoria Russell with Contributions by Stephanie Geggier

Course Schedule

<table>
<thead>
<tr>
<th>Lab Date</th>
<th>Exp #</th>
<th>Experiment Title</th>
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<tbody>
<tr>
<td>Sept 6</td>
<td>1</td>
<td><strong>Drawer Check IN and Safety in the Laboratory</strong></td>
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<tr>
<td>Sept 13</td>
<td>2</td>
<td><strong>Introduction To LabQuest® Interface</strong></td>
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<td>Sept 13</td>
<td>3</td>
<td><strong>Molecular Geometry and Theories of Covalent Bonding (Done Outside Lab Time)</strong></td>
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<td>Sept 20</td>
<td>4</td>
<td><strong>Aspirin History, Chemistry, and Colorimetric Analysis</strong></td>
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<td>Sept 27</td>
<td>5</td>
<td><strong>Properties of Solutions; Colligative Properties</strong></td>
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<td><em>Experiment 3 - DUE DATE – Please submit #3 to your instructor WHEN the lab period BEGINS.</em></td>
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<tr>
<td>Oct 4</td>
<td>6</td>
<td><strong>Kinetic Iodine Clock Reaction – Part A: The Effect of Concentration On The Reaction Rate</strong></td>
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<tr>
<td>Oct 11</td>
<td>7</td>
<td><strong>Kinetic Iodine Clock Reaction – Part B: The Effect of Temperature and Catalyst On The Reaction Rate</strong></td>
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<tr>
<td>Oct 18</td>
<td>8</td>
<td><strong>Le Châtelier’s Principle</strong></td>
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<tr>
<td>Oct 25</td>
<td>9</td>
<td><strong>Determining The Equilibrium Constant for Bromothymol Blue and Bromophenol Blue</strong></td>
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<td>Nov 1</td>
<td>10</td>
<td><strong>Ksp – Studying the Equilibrium Solubility of Insoluble Salts</strong></td>
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<td>Nov 8</td>
<td>11</td>
<td><strong>Buffered Solutions; Designing Solutions To Resist Changes in pH</strong></td>
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<td>Nov 15</td>
<td>12</td>
<td><strong>Acid - Base Titrations</strong></td>
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<tr>
<td>Nov 22</td>
<td>13</td>
<td><strong>Electrochemistry – Oxidation Reduction Chemistry</strong></td>
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<td></td>
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<td><strong>Laboratory Check – Out</strong></td>
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<td>Dec 16</td>
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<td>~ <strong>CHEM-UA.126 Laboratory Final Exam</strong> ~</td>
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PRE LABORATORY QUIZZES Are Due 11:59 PM the night before the scheduled LAB

*TAKE HOME LAB
Laboratories will be held in room 151 Brown.
The lab’s are held on Friday

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

I. **Course Description**

Welcome to the General Chemistry I laboratory! The objective of this course is to become proficient in techniques used by chemists, to carry out experiments safely and carefully, to obtain data and to analyze data correctly. You will learn many techniques such as titration, colorimetry, calorimetry, fractional crystallization and so on. Many of the experiments are scheduled to follow the topics of the lecture portion of the course. Try to see the connections between the two. Lab work will help you to understand the material covered.

1
II. Required Materials

- **Textbook:** *Experiments in General Chemistry, Part II, 3rd Edition*, by Barry Rugg & Victoria Russell with Contributions by Stephanie Geggier (must be bought at the NYU Bookstore).

- **Personal Protective Equipment (PPE):** 12 disposable lab coats ($18), full coverage safety goggles ($5), and 1 box of disposable rubber gloves ($8) must be purchased in the chemistry stockroom using NYU CAMPUS CASH only.

- **Software:**
  - Logger Pro®, available for free download from the course NYU Classes site (Sec001, resources tab, course software folder, password: conservation)
  - Spartan Software Version 7 Instructions for purchase at a special discounted price ($25) are described at the end of this syllabus.

III. Webcom

The textbook (lab manual) is complemented by a web site (Webcom) specifically designed to provide help and support in preparation for each experiment. When you purchase the lab manual, you will be given an access code to set up a personal account at the Webcom site. Access codes are not reusable. Once you set up the account with user ID and password, this is all the information you will require to log on. You will have to provide your mother’s maiden name when you set the password. If you forget the password, it can be retrieved with your mother’s maiden name through an automated system. User ID, password and mother’s maiden name are all case sensitive and so be careful to record exactly how you set up your log on access.

Once you have access to the Webcom site, check out the different tabs (Welcome, Lab resources, etc.). In the **Lab content** tab you will find a **drag-and-drop reinforcement activity** and a **pre-lab assignment** for each experiment. The reinforcement activity should be attempted after you read the **Background Information** for each experiment in the lab manual.

**Safety in the Chemistry Laboratory** (Experiment 1) is accompanied by a 25-question test (found at the Webcom site) using multiple choice, matching and true/false type questions. There are links to 3 safety videos at the Webcom site (and below) that should be viewed prior to attempting the on-line Safety Quiz. You must get at least 80% correct but you can take the test as many times as you like until you get 100% up until the deadline (11:59 pm the evening before Experiment 2). This grade is recorded as a full lab grade that will give everyone a nice start to your lab experience.

For all other experiments (excluding the take home lab, experiments #3), a pre-lab assignment is to be taken on Webcom and due at 11:59 pm the evening before the laboratory is scheduled.

You will be able to access your grade for the pre-lab assignment in the gradebook right after completion. You will also be able to see the grades for the written portion of the lab at the Webcom site as they are recorded. It is your responsibility to make sure the grades recorded on Webcom are correct and consistent with the graded lab reports returned to you.

ALL ANSWERS FOR TESTS AND QUIZZES TAKEN ON-LINE WILL BE AVAILABLE AT THE WEBCOM SITE GRADEBOOK ON THE DAY AFTER THE CLASS HAS COMPLETED THE EXPERIMENT.
IV. How to Prepare for an Experiment

In order to do a good job on the experiments, it is essential you come well prepared.

To prepare for each experiment (Experiments 1-13):
1) Read the **Background Information** in the lab manual (including sample calculations);
2) Review the **PowerPoint presentation** available at NYU Classes site (Sec001) in the Resources tab (Laboratory folder) in pdf format (which you can print if you choose).
3) You can try the **drag-and-drop reinforcement activity** to test yourself on the experiment content.

Next,
4) Prepare a **laboratory preparation sheet (LPS)** and bring it to lab. The LPS must contain (1) the title of the experiment, (2) balanced chemical equations if the experiment involves one or more chemical reactions, (3) a chemical table including columns for chemicals (including molarity for solutions), amount needed, and safety hazards, and (4) a flowchart (see appendix V of the manual). For experiment 7, you will prepare five data sheets with a different format (sample data sheet shown in manual).

5) Take the **Pre-Lab Assignment**, which is to be completed on-line at the Webcom site. The pre-lab assignment includes general safety questions and relevant technique questions; also several questions based on the content in the Background Information with a focus on the sample calculations. In some cases you may have to create a graph using Logger Pro to be handed in. The pre-lab assignments are available to you one week prior to the lab and must be completed by 11:59 PM the evening before lab. You will have two hours to complete the Pre-Lab assignment once you have started. **It cannot be paused once you have begun.** You will have one attempt at the assignment, so be prepared before starting.

**Experiment 3** is to be completed at home and will be **DUE in LAB on Friday Sept 27**.

**NOTE:** **Experiment 8 and 13** strongly correlates with **Midterm 1 and 2**. Unfortunately I cannot change the day experiment 8 is scheduled, but I will allow some wiggle room by class vote ONLY to complete experiment 13 after Thanksgiving Break. So by class vote, this experiment may be done after the Thanksgiving Break, but I **strongly urge** we complete the entire lab course **Friday November 22** and **NOT** return after Thanksgiving Break.

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**Required Safety Videos**

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<tr>
<td>Rugg Safety Part 1</td>
<td><a href="https://www.youtube.com/watch?v=RHC30lmNQuA">https://www.youtube.com/watch?v=RHC30lmNQuA</a></td>
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<tr>
<td>Rugg Safety Part 2</td>
<td><a href="https://www.youtube.com/watch?v=u9a-60rCNR4">https://www.youtube.com/watch?v=u9a-60rCNR4</a></td>
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<tr>
<td>ACS Safety Video</td>
<td><a href="https://www.youtube.com/watch?v=0zHev9iM8kU">https://www.youtube.com/watch?v=0zHev9iM8kU</a></td>
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V. Basic Laboratory Rules

1) Laboratory Safety

SAFETY IS OF PARAMOUNT IMPORTANCE IN THE LABORATORY. If you do not follow the safety rules presented to you, you will be removed from the lab and you will lose credit for the experiment.

WEAR SAFETY GOGGLES AT ALL TIMES IN THE LABORATORY

Proper Lab Attire is required!!!

a. As stated above, everyone will be required to wear disposable lab coats during each experiment.
b. Clothing that covers your legs and shoulders are required for this course. This does not include stockings or ripped jeans.
c. No shorts or short skirts
d. No exposed bellies
e. Closed shoes must be worn at all times. No ballet flats, flip flops, or open shoes of any kind are permitted.
f. In other words, minimal skin should be showing from the waist down. If you come to lab improperly dressed, you will be sent home.

Please shut off your cell phones while in the lab.

  g. Receiving calls or texting is not permitted.
h. IPODs are also not permitted.
i. Food or water is not allowed in the lab.
j. Gum chewing is not permitted.

Failure to follow any of the rules will result in expulsion from the laboratory!

IF YOU DO ANY UNAUTHORIZED EXPERIMENTATION, YOU WILL FAIL THE COURSE!!!

2) Clothing Lockers

Personal belongings are not permitted in the lab. Coats, book bags, purses, etc., will have to be placed in a hall locker. These lockers are located on the 4th floor of the Silver building. How to use the clothing lockers...

a. Go to any locker on the 4th floor.
b. Place your items inside and close the door.
c. On the keypad press C, then any 4 number combination you will remember, then the key (lock button). The lock will engage. I suggest you take a picture of your locker as a record.
d. To open the locker, simply repeat the earlier steps – Press C, then the same 4 number combination that you entered earlier, followed by the key (lock button). The lock will release. After you have removed your items, please leave the locker as it is, you do not need to re-engage the lock.
e. Please note that once the lock engages it will only remain locked for 5 hours. You must return as soon as possible following your lab and reclaim your belongings. After 5 hours have passed, the lock will disengage automatically, and the contents will be accessible to anyone.
f. Items left in a locker past their removal time are subject to removal and disposal.
g. If your locker does not open, the stockroom staff will be able to help you open your locker if you can prove it’s your locker (take a picture).
3) Waste Minimization
In an effort to minimize costs and to reduce any environmental damage, we all will make a concerted effort to avoid wasting laboratory materials and to dispose of all chemicals and other materials properly. With this in mind, you must observe the following rules in the lab:

a. 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.

b. Take only the amount that you need, and DO NOT Return any reagent to the bottle.

c. Dispose of all materials into the proper waste container (again, read the labels). NOTHING WILL GO INTO THE SINKS. DISPOSABLE PIPETS, and (of course) BROKEN GLASS MUST be disposed of in the "Broken Glass" container (not the regular trash) with rubber gloves and disposable pipets. Liquid chemical waste from the experiments is disposed of in the designated waste drum in the center of the lab.

4) Laboratory Reports
When you enter the lab, you will go to your assigned lab station with your partner and wait for some introductory comments by your instructor. After these comments, you will be instructed to begin the experiment. The experiment has both a data section and a post-lab section. The data section is where you record the results of the experiment. The post-lab contains questions to be answered based on the contents of the experiment. It is advisable to read the post-lab questions to prepare yourself for what you will be required to do after you complete the experiment. This can help to complete the experiment in a timely manner. You and your partner will work collaboratively on the data and post-lab sections and hand in one report for the two of you. If your partner is absent, we will assign someone to work with you. Since you will work closely with your partner, you will constantly be discussing the experiment as well as the required calculations.

Lab reports consist of a cover sheet, data sheets, graphs, post-lab, and LPSs of both partners. Completed lab reports are due on the day that you perform the experiment, before you leave the laboratory. Instructors are not authorized to accept laboratory reports after the class has ended. Late labs lose points or may not be accepted.

5) Miscellaneous

○ You should listen for announcements and monitor the whiteboard and screens for any changes that are made as the experiment is performed. It is your responsibility to notice and follow these instructions.

○ During the experiment, feel free to ask (reasonable) questions. It is a learning experience, not a test. It is probably best to ask an instructor your question since your classmates are no more experienced than you. You will work with a partner for all experiments.

○ Dry “labbing” (reporting data which you and your partner did not collect yourselves) is cheating and will be treated as such. If you are caught using data from another student, from another semester, or from your imagination, you will fail this course. I think it is only fair to point out that the laboratory is monitored by video equipment 24 hours a day (to protect the computers, of course).

VI. Attendance
THERE WILL BE NO MAKEUP LABS. If you are too ill to attend lab, see a doctor or go to NYU Health Services. You are required to bring to me documentation that will verify your illness. The documentation must be on a physician's stationary, and I may call for verification. Excused labs will not count when we evaluate your grade. Similarly, if you must miss a lab because of religious observance, you should provide some documentation to be excused. THERE WILL BE NO EXCEPTIONS TO THESE RULES.
VII. Grading

Each experiment is graded out of 100 points. Each pre-lab assignment counts for 30 points, the quiz for 6 points, the LPS for 9 points, and the written lab portion for 55 points. You will also take a written final exam during the final exam week. Your lab grade will be incorporated in your final grade for the lecture and laboratory course and will be worth 25% of your final grade.

Laboratory Grading Scheme:

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<tbody>
<tr>
<td>Experiments (pre-labs, quizzes, and lab reports)</td>
<td>75%</td>
</tr>
<tr>
<td>Written final exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

VIII. Spartan Student Version 7 (Experiment 14)


You will need to specify the platform (Windows or Mac) and then add the software to your cart. When you go to “checkout” there is a Coupon Code field (see red box below). Type in NYU25 and click the Apply button to receive the $25 discount. Once the order is processed, you will receive a note that is a confirmation and receipt, and a second note that contains a download link for the software as well as the activation code to enable it.

Lab Report for Experiment 14 (ONLY)

This experiment is group work. Still we recommend you to do the exercises with Spartan on your own. Then compare the results with your lab partner and write the lab report together. If your lab partner withdraws from the course shortly before the due date, you have to work alone.

Each group must turn in one lab report, which should be a joint effort. If you let your partner write the lab
report by himself/herself, it is not only unfair, but also you will have a big disadvantage on the lab final/lecture final and in future classes that utilize Spartan.

When writing the report, you should use the “laboratory report template” posted on NYU Classes, under the Resources tab. Reports should be written with proper grammar. Spelling and grammar errors are not acceptable. Chemical formulas must be properly formatted (charges must be written as superscript; the number of atoms must be written as subscript).

Lewis structures can be drawn by hand or with the software ChemDraw. ChemDraw can be downloaded for free via the NYU library web site:

http://guides.nyu.edu/c.php?g=276594&p=1844910

Structures can be easily copied into the lab report using copy and paste. It is worth downloading and becoming familiar with this software now because you will use it in the organic chemistry lab extensively. There are dozens of ChemDraw tutorials available online. For example,

https://www.youtube.com/watch?v=00xtRYpTHaI&t=178s.

The lab report for experiment 14 is due on the due date at the beginning of the lab session. The lab report must be submitted (1) as a hard copy (one per group) to your laboratory section instructor, and (2) uploaded to NYU Classes as a pdf file (using the “Turnitin” feature) before the lab session begins. Even if you submit a hard copy on time, if your report has not been uploaded before the laboratory session starts, the report will be considered late. Late reports will incur a 25% point deduction if turned in within 24 hours after the assignment due date/time. Assignment submission beyond 24 hours after the original deadline will result in a score of “0.”

In order to upload the lab report to NYU Classes, go to your lab section site and then to Assignments. Only one student per group should upload the lab report to NYU Classes.

Note: DO NOT submit a scan or pictures of your lab report to NYU Classes. It is not necessary to include hand-written Lewis structures in the version you upload.

IX. Academic Honesty

All students are required to comply with the NYU Academic Integrity policies and the Honor Code, which can be found at:

http://cas.nyu.edu/page/academicintegrity
http://cas.nyu.edu/page/honorcode

It is expected that all students are aware of their responsibilities not to cheat. If you use another student’s results as if they are your own, this is considered cheating. Each student must carry out his/her own experiment. Cheating off of another person’s work is unethical, unacceptable, and is a direct violation of NYU’s policies, and will be dealt with accordingly.

Plagiarism is to use someone else’s ideas, words, or figures as your own. That means that you cannot use current or old reports, data, figures (such as Spartan or ChemDraw figures), etc. from your textbook, friend, labmate, roommate, the Internet, commercial report-writing websites, or anyone other than yourself.

THIS WILL NOT BE USED FOR SEMESTER II (Left in for consistency)

Every group is required to upload their lab report for experiment 14 to Turnitin as a pdf file. Note that Turnitin will automatically scan each report for overlap with any other report ever submitted to Turnitin as well as resources on the web (Turnitin scans not only for overlap in writing but also figures, tables and schemes), i.e. we WILL recognize if you cheated or plagiarized. If we recognize that you plagiarized, you will receive a “0” for this lab. Note that if Turnitin recognizes that groups worked together on laboratory reports, it alerts us to which laboratory reports have notable overlap. Each group whose laboratory report is flagged will be penalized independently, regardless of whether you are actually the group that copied the laboratory work or the group that allowed access to their laboratory work.

HAVE A GREAT SEMESTER AND GOOD LUCK!