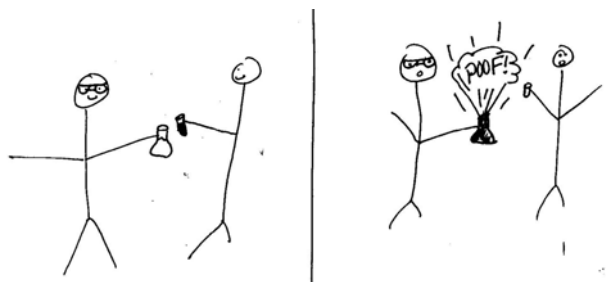


# 204 FH

General Chemistry Laboratory A



Senior Laboratory Coordinator: Angela E. Boerger

Office Hours: Monday and Wednesday, 10:30 – 11:15, and always by appointment

Office Location: 428 Flanner Hall, Office Phone: 773-508-3135

Email: [aboerge@luc.edu](mailto:aboerge@luc.edu)

**Put Chem 111, your section #, and your TA's name in the subject**

Welcome to Chem 111. We are looking forward to working with you this semester.

**Appropriate clothing must be worn that minimizes potential chemical contact with your skin. Shoes that adequately cover the entire foot are required. Sandals, open-toes shoes, perforated shoes, open-backed shoes are not acceptable. No skin should be exposed on your feet or legs, so clothing that covers and protects your body from the waist down (including your ankles) should be worn. Additionally, a lab coat will be required.**

**Participation is mandatory. You are not allowed to make up a quiz or a lab in another section of Chemistry 111. Missing 2 of the labs, which is over 25% of the lab work, is significant and unacceptable and will result in academic failure, as will missing 1 or both of the Practical Quizzes. Please look at the schedule at the end of this syllabus and consider the negative impact that missing one of the hands on laboratory sessions will have on your educational experience, including your performance on the Practical Quizzes. It is in your best interests to register for a section that does not conflict with other obligations. Students should not enroll in a lab section that they cannot fully attend.**

**Students who are not concurrently enrolled in, or have not completed General Chemistry 101 or 105 with a grade of C- or better will be removed from the class.**

**Failure to adhere to any lab safety rules can result in expulsion from the lab session and or course with no opportunity for make-ups.**

## **REQUIRED ITEMS**

- 1) Chem 111 Laboratory Packet, which contains copies of the experiments to be performed. It is essential that you read the experiment before coming to class so that you can complete the lab and the write up in a timely fashion.
- 2) Safety goggles. These must be type G, H or K goggles and must meet or exceed ANSI Z87.1 requirements. Safety glasses do not meet our requirements.
- 3) Laboratory Coat
- 4) You will need a scientific calculator for most experiments and the practical quizzes.
- 5) The use of a non-erasable pen is required for all written work. No white out is allowed.

## ASSESSMENT

The grading scale is as follows. There will be no change in the grading scale or in the number of points. We will not grade on a curve or drop a grade.

Grading Scale	
% total	Grade
94.0 - 100	A
90.0 – 93.9	A-
87.0 – 89.9	B+
84.0 – 86.9	B
80.0 – 83.9	B-
77.0 – 79.9	C+
74.0 – 76.9	C
70.0 – 73.9	C-
65.0 – 69.9	D+
60.0 – 64.9	D
0-59.9	F

Breakdown of Points Available		
Activity	Origin	Points
Lab 1a: Intro to Data Analysis (SF) [5]	lab	5
Lab 1b: Reactions of Reagents [10]	lab	10
Lab 1c: Intro Accuracy Hwk [5]	sakai	5
Lab 1d: Social Justice Discussion on Non-Ordinary Materials	sakai	4
Lab 2a: Accuracy and Precision Pre-lab quiz [3]	sakai	3
Lab 2b: Accuracy and Precision [10]	lab	10
Lab 2c: Acc and Prec graph [5]	manual	5
Lab 2c: Accuracy and Precision Homework [5]	sakai	5
Lab 2d: Social Justice Salt Discussion	sakai	4
Lab 3a: Mass Relationships Pre-lab quiz [3]	sakai	3
Lab 3b Mass Relationships [10]	lab	10
Lab 3c: Mass Rel Post Disc [4]	sakai	4
Lab 3c: Mass Rel Post Disc Quiz [1]	sakai	1
Lab 3d: Mass Rel % Comp Hwk [5]	manual	5
Lab 4a: Vitamin C Pre-lab quiz [3]	sakai	3
Lab 4b: Vitamin C [10]	lab	10
Lab 4d: Social Justice Discussion on History of Vitamin C	sakai	4
Lab 5a: Deductive Chemical Reasoning Pre-lab quiz [3]	sakai	3
Lab 5b: Deductive Chemistry [10]	lab	10
Lab 5c: Ded Chem Post Disc [4]	sakai	4
Lab 5c: Holmes Post Lab/Discussion Quiz [1]	sakai	1
Lab 6a: Estimating Avogadro's Number Pre-lab quiz [3]	sakai	3
Lab 6b: Avogadro's Number [10]	lab	10
Lab 6c: Avogadro's Number Disc [4]	sakai	4
Lab 6c: Avogadro's Number post discussion quiz [1]	sakai	1
Lab 7a: Energy Relationships Pre-lab quiz [3]	sakai	3
Lab 7b: Energy Relationships [10]	lab	10

Lab 7c: Energy Rel Hwk [5]	manual	5
Lab 5d: Social Justice and Energy Discussion [4]	sakai	4
Lab 8a: Spectrophotometric Analysis of Aspirin Pre-lab quiz [3]	sakai	3
Lab 8b: Analysis of Aspirin [10]	lab	10
Lab 8c: Aspirin hwk (manual) [5]	manual	5
Lab 8d: Social Justice and Pharmaceutical Innovations (Aspirin)	sakai	4
Lab 9: Percent Hydrogen Peroxide in Dental Whiteners	manual	10
Practical exam 1 [20]	quiz	20
Practical Exam 2 [25]	quiz	25
Safety [5]	safety	5
z Check out/ Magic Sand Activity [2]	lab	2
<b>Total</b>		<b>233</b>

Your written work, as well as TA observations will serve as the basis for earning points and informing me of your progress. Written work will be graded with an emphasis on correct use of significant digits, consistency of results (do data and observations match conclusions), appropriateness and correctness of analysis, and thoroughness in responses.

A one point penalty will be assessed for any written work which is not done in non-erasable pen, or if white out is used. Assignments may not be submitted by email.

Two practical lab quizzes covering basic skills and comprehension will be given. In part, a laboratory practical quiz requires a student to demonstrate knowledge and skills by performing tasks in the laboratory. In this way, a student's ability to use equipment properly and demonstrate correct technique can be evaluated. A practical lab quiz will also cover basic understanding of the fundamental models of chemistry illustrated in the laboratory experiments. Questions of this kind will ask you to analyze data similar to laboratory experiments you performed. Questions may combine elements of different labs. **You may use your own graded data sheets, lab manual, syllabus, pre-lab lectures, and tutorials from Chem 111 on the practical quizzes.**

Safety points will be awarded on the basis of safe conduct in the lab. A safe lab environment is essential, and unsafe actions will definitely result in grade degradation. The following is a partial list of ways you can lose safety points:

- Coming late to class, after the pre-lab lecture has started will result in deductions of your safety points.
- Not bringing goggles to lab.
- Not wearing your goggles consistently in lab can result in expulsion from the lab. Safety glasses do not meet our safety requirements.
- Not keeping your equipment drawer in good condition.
- Not adhering to Disposal Instructions indicated in each lab handout.
- The lab-pro equipment used is breakable, and requires special care. You and your partner will be assigned a box to use, and if the equipment is found to have been handled negligently, points will be deducted from both your safety points and your lab score.
- Not dressing appropriately for lab.

## ATTENDANCE

- As labs and quizzes can only be completed in a staffed lab, attendance is mandatory, and every student is expected to attend every scheduled class.
- You must attend the section in which you are enrolled.
- There is a point value associated with the work accomplished in each class, and you will not be able to earn points for classes that you do not attend.
- If the university is open, you are expected to attend class and to be on time.
- If you arrive to lab after the conclusion of the pre-lab lecture, you will not be allowed to perform the lab.
- **There will be no makeups allowed.** You will not be permitted to attend another lab section to makeup a missed lab.

**If you miss a lab, contact Angela Boerger, [aboerge@luc.edu](mailto:aboerge@luc.edu) , immediately.**

Please request sample data for that lab. Sample data is data similar to what you may have obtained in lab and may help you study for Quizzes. (Sample data is not the Virtual Lab.) You will be responsible for understanding the missed material, and **normal deadlines will apply for completing homework and Pre-Lab Quizzes on Sakai. For graphs and homework where a hard copy is required, please turn the assignment into your Primary Laboratory Coordinator, with a note requesting full credit due to your absence the prior lab session.**

You may complete a 10 point Virtual Lab Assignment one time over the course of the semester. This assignment is done online and is intended to replace an absence in lab which is **unavoidable and for a significantly important reason**. You may not use it to replace a poor lab score or homework score. **The due date/time for the Virtual Lab assignment can be found on the schedule at the end of the syllabus, and is the same for all sections.** Please turn a hard copy of the assignment to Angela Boerger directly or drop it off in the department office, and ask that it be put into Angie's mailbox with verification of the date and time turned in. Do not submit the assignment via email. Directions for this assignment can be found at the end of the Lab Manual, and direct any questions you have to Angie, [aboerge@luc.edu](mailto:aboerge@luc.edu). If you complete the virtual lab, you will not receive any feedback on it until the end of the semester.

*If 2 or more labs are missed (including the Virtual Lab Option), or if either Practical Quiz is missed, it will result in an academic failure regardless of the overall points earned in the class.*

Students must make information concerning time conflicts with University sponsored events available to the instructor at the beginning of the semester.

If unintentional errors are discovered in the syllabus, the instructor reserves the right to revise as necessary.

## ROLE OF TEACHING ASSISTANTS

In each lab session, your primary interaction could be with a Teaching Assistant. The function of a TA is to help you get good data in a safe fashion, and to provide individual help on each lab when necessary. The role of the Laboratory Coordinator is more behind the scenes: to plan the curriculum, prepare both handouts and powerpoints, and to train the TAs so that the lab experience is educational, fair, and effectively run for students enrolled in all of the sections. Please know that the Instructor is available to you if there are any questions or concerns that the TAs cannot handle appropriately. Each TA will keep office hours as well, and are posted on Sakai.

## **Tutoring**

The Tutoring Center is offers tutoring in Biology, Chemistry, Math, Physics, and Statistics. To see a full schedule of times, or to find more information on tutoring services, visit the Tutoring Center online at [www.luc.edu/tutoring](http://www.luc.edu/tutoring).

## **GENERAL POLICIES**

Completed written work will be stored in your lab folder. Your laboratory folder will be arranged alphabetically with other students in your section, and at the end of the semester should be complete. You may take the contents of your folder home before a practical quiz in order to study, but you should return the folder when you complete the quiz.

Checkout is your opportunity to verify that the scores submitted to me by your TA are indeed correct. If there are any discrepancies in the scores submitted by your TA to me, your proof of having earned a specific grade on a particular lab is the presence of that graded lab in your lab folder at the end of the semester.

Each student will be assigned a drawer with glassware and equipment. At the beginning of the semester, the drawer contents will be checked for completeness. The drawer may be shared with other students over the course of a week, and therefore, it is essential that you clean the equipment used after an experiment is completed. The drawers may be checked sporadically. If glassware is broken, the student is responsible for requesting a replacement item. At the end the semester, the drawer will be checked out again for completeness.

## **Regarding Sakai and Technical Difficulties**

It is *strongly encouraged* that all required submissions to Sakai as well as writing lab reports, opening course/data/experiment files, be done on a reliable wired internet connection [not wireless], that of which the University itself provides in the Information Commons and various computer labs on the Lake Shore Campus.

Under NO circumstances will excuses of “technical difficulties” be accepted as this syllabus is stating all students should use a wired internet University computer [not wireless internet] to submit work in Sakai, write lab reports, open course/data/experiment files. This list is not exhaustive and it should be noted that any activities this course may require a computer or internet connection for should be completed using University computers with wired internet connection. Use of home internet [wired or wireless], University wireless, or public wireless is at your, the student’s, own risk. It is not prohibited but as Instructor has stated in this syllabus, Instructor is not responsible for technical difficulties of non-University devices [cell phone, tablet, home/work/public wireless internet or computer]. Do not submit items in Sakai using a cell phone or a tablet device as these do not count as reliable internet connection tools.”

## **ACADEMIC INTEGRITY**

We wish to make it clear that the standard of academic integrity and personal honesty delineated in the College of Arts & Sciences Statement on Academic Integrity is expected of every student and will be enforced. Details can be found at [http://www.luc.edu/cas/faculty\\_resources.shtml](http://www.luc.edu/cas/faculty_resources.shtml). Cheating can take many forms in lab, but the most common form is to copy data and answers to analysis questions, or to share files/answers for homework assignments. The reports and data/ analysis you submit for marking must be your own, and if it is not, no credit will be awarded for the entire lab, nor will make-ups be granted. Additionally, findings of dishonest academic behavior are reported to the Chair of the Chemistry Department and to the Dean’s Office, and are entered into an individual’s record. A copied answer or report will result in penalty for all students involved.

## **Disabilities Accommodations**

If you have a documented disability and wish to discuss academic accommodations, please see your primary Laboratory Coordinator by the second meeting of lab. (The Coordinator of Services for Students with Disabilities is located in the Sullivan Center for Student Services, Suite 260, 508-7714, and must be contacted independently.)

## **EDUCATIONAL GOAL**

In this second semester of general chemistry laboratory, my purpose as your chemistry instructor is to continue to provide a hands on introduction to experimental methods of scientific investigation in chemistry. The fundamental models of chemistry discussed in lecture will provide the basis for understanding the experimental laboratory work. Each lab will provide a practical opportunity for you to gain competence with the basic techniques of lab work and the practical experience necessary to understand its significance. It is my wish that this laboratory experience will encourage students who are seeking intellectual challenges along with an understanding of the chemical principles in the laboratory.

Conducting experiments and collecting data to test the validity of theories and models requires a different set of skills than those required for success in the lecture part of a general chemistry course. During a laboratory activity, each student's hands, mind, eyes, as well as other senses are focused on the task at hand. Success in the lab involves skills in making perceptive qualitative observations and accurate quantitative measurements.

With each laboratory experiment, I intend to pose relevant questions, and along with TAs, to help each student to execute a laboratory approach which will yield reliable data related to these questions. Each student is required to obtain data and to depend upon this data when answers to these questions are drafted. Each lab will be structured enough so that you should not feel lost or confused, but not so structured that you will find it unnecessary to think for yourself.

## **INSTRUCTIONAL PHILOSOPHY**

I believe in a Carl Rogers type of "freedom to learn" educational philosophy; in my classroom and lab I encourage students to "self-actualize" in obtaining a functional knowledge of chemistry and consequently earning a specific grade. I expect that all students will consciously do the work required to earn the grade they seek. In that way, I can in good conscience sign a passing grade report.

## **IDEA: Individual Development and Educational Assessment**

Objective 1: Learning to apply course materials (to improve thinking, problem solving, and decisions)

- Understand and apply proper labeling to include a value, units, and chemical identity, as well as pertinent stoichiometry and other relevant calculations.
- Understand and apply the rules for obtaining the correct number of significant figures with analysis of personally taken data.
- Execution and analysis of results.
- Analysis and understanding of the meaning of percent relative error.
- Understanding the creating graphs and the meaning of graphs.
- Understanding and analysis of the result of errors in the procedure execution.

Objective 3: Gaining factual knowledge (terminology, classifications, methods, trends).

- Competent recording of observations.
- Produce correct Net Ionic Equations and understand their meaning.
- Use best practices with balances.
- Competent use of volumetric glassware.
- Proficient use of burets.

## LOST AND FOUND

Any items mistakenly left in lab will be taken to the Chemistry Department office, 125 Flanner Hall, and can be identified and claimed there. **Please put your name on your data sheets, lab manuals, calculators and other personal items.**

## Safety in the Laboratory

Laboratory Safety is everyone's responsibility. By registering for and participating in this course you agree to abide by the following rules. Failure to follow these rules constitutes grounds for withdrawing the offending student from the lab session and or course at any time.



1. To wear approved safety goggles at all times in the laboratory.
2. To know both the location of and how to use eye washes.
3. Not to wear contacts in the laboratory.
4. To wear appropriate clothing that minimizes potential chemical contact with your skin. Shoes that adequately cover the entire foot are required. Sandals, open-toes shoes, perforated shoes, open-backed shoes are not acceptable. **No skin should be exposed on your feet or legs, so clothing that covers and protects your body from the waist down (including your ankles) should be worn.** You must be dressed appropriately to perform an experiment, including your lab coat and goggles.
5. To know both the location of and how to use the safety showers.
6. To know both the location of and how to use the fire extinguishers.
7. Not to perform unauthorized and unknown experiments, nor work in the lab without appropriate supervision.
8. Not to take chemicals or equipment out of the laboratory.
9. Not to engage in horseplay or any clowning around that might endanger you or other students.
10. Not to eat, drink, chew gum, or smoke anything in the laboratory **at any time**. No head sets or cell phones.
11. To keep your lab space clean and tidy.
12. To ask your instructor or TA when in doubt about procedures.

By using common sense and following these rules, it is unlikely that you or your classmates will be involved in or injured in a mishap in the laboratory.

While it is very important that you do your part to prevent an accident from occurring, it is just as important to know what to do if someone is injured. Critical Injuries include: glass in his/her eye(s), serious cuts, severe chemical burns, severe fire burns, seizures. **Immediately call for help using either the lab phone (security number is taped to phone handle) or the emergency phone in the hallway directly outside the laboratory.** Anyone with chemicals or foreign objects in his/her eye(s) will be escorted to the Wellness Center or to the hospital.

### **First Aid Basics**

Minor Cuts: Band-Aids are available. If you bleed through one Band-Aid, another should be applied over the first. If you bleed through two Band-Aids in a few minutes, or if there is any possibility of broken glass in a cut, you will be escorted to the Wellness Center.

Minor Burns from Fire: If the skin is unbroken, run cool water over the area or submerge in a cool water bath for at least 5 min. Apply a cool, damp towel.

Chemicals in Eyes: Immediately flush eyes with water at the eye wash. Continue with flush for at least 10 minutes. You will probably need to hold the affected eye(s) open to do this properly.

Chemicals on Skin: Dust any dry chemical off with a dry towel and then flush with water. Flush any wet chemical from the skin immediately with water at the sink or safety shower. If clothing is affected, remove clothes before rinsing! Continue with rinse for at least 10 minutes.

### **Fire Hazards**

The primary heat source in this laboratory is the Bunsen burner, which is fueled by natural gas. A lit Bunsen burner is a small, controllable fire, but the heat generated by the burner fire can be quite hazardous in certain circumstances. It can serve as an ignition source for other combustible materials in the lab such as paper (lab handouts, paper towels, filter paper, etc.), plastics (wash bottle), flammable liquids (acetone, ethanol). A burner fire can also ignite clothing and hair. Proper operation of a burner and the absence of combustible materials in the proximity of the burner will significantly reduce the risk of a fire. Each lab is equipped with a fire extinguisher, fire blanket, and safety shower, which should be used in a fire emergency.

Procedure in a case of a fire: Remain calm; alert the instructor and your immediate neighbors. Personal safety, yours and others in the labs, is always the top priority. A small fire in a small container can be suffocated by covering it with a watch glass or inverted beaker. With a somewhat larger fire, you need to decide whether or not you think you can control it with a fire extinguisher.

Use of a Fire Extinguisher: Located by the doors in both labs; a back-up fire extinguisher is located at the west end of the floor. Maintain an escape position; i.e. stay between the fire and the doorway. **Break the plastic ring, pull out the metal ring, release the hose from the bracket, direct the hose at the base of the flames, and press the lever down.**

Note: the fire extinguishers are heavy and not particularly easy to direct. These are multipurpose dry chemical extinguishers, safe for anything we use in lab.

### **Tentative Chem 111 Order of Labs**

Lab #1	Intro to Data Analysis/Reaction with Ordinary Materials
Lab #2	Accuracy and Precision in Measurement of a Salt Solution
Lab #3	Determining Both Chemical Equations and Percent Composition from Mass Relationships
Lab #4	Determination of the Vitamin C Content in Juice
Lab #5	Deductive Chemical Reasoning
Lab #6	Estimating Avogadro's Number Using Octadecanoic Acid
Lab #7	Energy Relationships in Chemical Equations
Lab #8	Spectrophotometric Analysis of Aspirin
Lab #9	Quantification of Active Ingredient in Dental Whiteners
Make up	Virtual Lab Determination of the Molarity of an Unknown Solution of Silver Nitrate



**~ January 2016 ~**

<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>
<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b> Check in/SF Lab #1	<b>22</b>
<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b> Lab #2	<b>29</b>

**~ February 2016 ~**

<b>Mon</b>	<b>Tue</b>	<b>Wed</b>	<b>Thu</b>	<b>Fri</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b> Lab #3	<b>5</b>
<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b> Lab #4	<b>12</b>
<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b> Practical Quiz #1	<b>19</b>
<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b> Lab #5	<b>26</b>

~ January 2016 ~

Mon	Tue	Wed	Thu	Fri
29				

~ March 2016 ~

Mon	Tue	Wed	Thu	Fri
	1	2	3 Lab #6	4
7	8	9	10 SPRING BREAK	11
14	15	16	17 Lab #7	18
21	22	23	24 EASTER BREAK	25
28	29	30	31 Lab #8	

~ April 2016 ~

Mon	Tue	Wed	Thu	Fri
				1
4	5	6	7 Practical Quiz 2	8
11	12	13	14 Lab #9	15
18	19 Virtual Lab due by noon	20	21 Check Out	22
25	26	27	28 No Lab	29