



Spring **2020**
DEPARTMENT OF CHEMISTRY

CHEMISTRY **105**

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GENERAL CHEMISTRY EXPERIMENTS



CHEMISTRY 105

General Chemistry Experiments

Spring **2020**

Department of General Chemistry
University of Illinois

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General Information

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Name _____

Campus Address _____

Telephone Number _____

Laboratory Section Information

Section Number _____

Time _____

Room _____

TA's Name _____

Introduction to Chemistry 105

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Read This First!

We have a good deal of material on the course website. Before reading this lab book visit the website and become familiar with it.

Most importantly, find your one-page summary of due dates for all assignments throughout the semester. To do this:

- Go to www.chem.illinois.edu
- Click on the day of your lab section. The one-page summary will look like what you can find on the next page of this lab book but it includes your specific due dates. It is a good idea to print out the schedule—the due dates are set and **late assignments will NOT be accepted**.

Read through the material given on the homepage (you will find general information, including a course materials list). In addition, click on “LON-CAPA Homework” and make sure you can sign in.

Please watch the “Introduction to Chemistry 105” video through the website. We explain the course policy and other useful details. There will be a Safety Orientation (including the Safety Features Scavenger Hunt and Waste Disposal Activity) in addition to a Lab 1 experiment on the first day of lab. Students will need their lab manual to complete these activities. Correct attire, a lab coat and goggles are mandatory to attend lab this week.

Before you go to your first lab, make sure you have/do the following:

- Bring your lab manual (this book).
- Prepare your lab manual (on the carbon copy pages at the end of Lab 1) with the data tables in Lab 1. These will be completed during your lab period and the white sheet submitted to your TA before you leave the lab.
- Bring goggles (required goggles: Honeywell Uvex Stealth OTG safety goggles) and a lab coat. Note: Students are permitted to purchase and wear either the standard white lab coat or the blue, fire-resistant, lab coat. It is recommended that students who plan to take upper-level (200 and above) lab courses purchase the blue, fire-resistant, lab coats since this is the coat that will be required for those upper-level labs.
- Wear the proper attire. The Safety Video, located in LON-CAPA, and the Safety Policy, located in this lab manual, provide information on proper lab attire.
- Complete PreLab 1 and the Safety Quiz before attending Lab 1.
- Recommended, but not required: Use the material listed in Lab 1 to complete the Waste Disposal Activity before Lab 1

REQUIRED ASSIGNMENTS TO ATTEND LAB AND GAIN ACCESS TO THE COURSE MATERIALS

There are several activities that must be **correctly** completed by each student before they may attend lab this semester and gain access to the remainder of the assignments in Chemistry 105. All of these activities are found in LON-CAPA and described below. Failure to complete any one of these activities will prevent the student from attending lab and will result in a zero for the lab and the Postlab assignments for each week that any one of the listed activities is not complete. After 3 weeks without completing any one of the activities listed below, the student will fail the course.

Assignment 1: Prelab 1.

Due Date: BEFORE the **first** lab.

Penalty if not complete by due date: Students who do not complete this assignment before their first lab session will be removed from the lab and will receive a zero on Lab 1 and Postlab 1. Students who do not complete this assignment by Lab 2 will be removed from the lab and will receive a zero on Lab 2 and Postlab 2. Students who do not complete this assignment by Lab 3 will be removed from the lab and will receive a zero on Lab 3 and Postlab 3. Students who do not complete this assignment by Lab 4 will fail the course and will not be permitted to attend any future labs.

Assignment 2: Safety Video and Quiz.

Due Date: BEFORE the **first** lab.

Penalty if not complete by due date: Students who do not complete this assignment before their first lab session will be removed from the lab and will receive a zero on Lab 1 and Postlab 1. Students who do not complete this assignment by Lab 2 will be removed from the lab and will receive a zero on Lab 2 and Postlab 2. Students who do not complete this assignment by Lab 3 will be removed from the lab and will receive a zero on Lab 3 and Postlab 3. Students who do not complete this assignment by Lab 4 will fail the course and will not be permitted to attend any future labs.

Assignment 3: Scavenger Hunt (completed during Lab 1)

Due Date: BEFORE the **second** lab.

Penalty if not complete by due date: Students who do not complete this assignment before their first lab session will be removed from the lab and will receive a zero on lab 2 and Postlab 2. Students who do not complete this assignment by Lab 3 will be removed from the lab and will receive a zero on Lab 3 and Postlab 3. Students who do not complete this assignment by Lab 4 will be removed from the lab and will receive a zero on Lab 4 and Postlab 4. Students who do not complete this assignment by Lab 5 will fail the course and will not be permitted to attend any future labs.

Assignment 4: Waste Disposal (completed during Lab 1; however, this assignment is available to the student at the same time as Prelab 1 and the Safety Video/Quiz. If the student feels comfortable reading the lab manual they may use the material presented in Lab 1 to complete the Waste Disposal assignment before attending lab so long as they understand the penalty explained below (indicated with **) regarding exhausting their attempts to correctly complete the assignment.)

Due Date: BEFORE the **second** lab.

Penalty if not complete by due date: Students who do not complete this assignment before their first lab session will be removed from the lab and will receive a zero on lab 2 and Postlab 2. Students who do not complete this assignment by Lab 3 will be removed from the lab and will receive a zero on Lab 3 and Postlab 3. Students who do not complete this assignment by Lab 4 will be removed from the lab and will receive a zero on Lab 4 and Postlab 4. Students who do not complete this assignment by Lab 5 will fail the course and will not be permitted to attend any future labs.

*****Additional Penalty information*****

If a student misses Lab 1 AND obtains an excused absence for that date, the student will be placed in an online Scavenger Hunt Assignment group and given the opportunity to complete the Scavenger Hunt before the second lab, for full credit.

If a student misses Lab 1 AND does not obtain an excused absence for that date, the student will be placed in an online Scavenger Hunt Assignment group and given the opportunity to complete the Scavenger Hunt before the second lab, **but the student will receive zero points for this assignment.** The student must still successfully complete this assignment, despite receiving zero points, as well as all of the other required activities listed above by the deadlines, in order to gain access to the remainder of the Chemistry 105 course in LON-CAPA.

If a student uses up all of the provided attempts to answer questions within the listed Activities 1–4, the student must contact the Lab Coordinator (sdesmond@illinois.edu) and request the necessary questions or assignment be reset. This is the only instance this semester where a question can be reset. If the student requires that a question or assignment be reset so that they may have additional attempts to correctly complete the assignment, **the student will receive zero points for the question or assignment,** but must still correctly complete the full assignment in order to gain access to the remainder of the Chemistry 105 course in LON-CAPA.

CHEMISTRY 105, SPRING 2020

Experiment Dates

Experiment	Date
Lab 1: The Chemistry Laboratory, Safety and Equipment	Week of February 3
Lab 2: Acid Content in Lemon-Lime Kool-Aid	Week of February 10
Lab 3: Spectrophotometric Analysis of Aspirin / Safety Activity 1: Chemical Pictogram Match Game	Week of February 17
Lab 4: Determination of Acetylsalicylic Acid in Aspirin / Safety Activity 2: Safety Crossword Puzzle	Week of February 24
Lab 5: Buffers / Safety Activity 3: Safety Data Sheets	Week of March 2
Lab 6: Determining pK_a of Aspirin	Week of March 9
Lab 7: Free Energy and Equilibrium / Safety Activity 4: Comparing Laboratory Gloves	Week of March 23
Lab 8: Electrochemistry	Week of March 30
Lab 9: Kinetics (Differential Rate Laws)	Week of April 6
Lab 10: Kinetics (Integrated Rate Laws)	Week of April 13
Lab 11: Hydrolysis of Aspirin (Kinetics)	Week of April 20
Lab 12: The Geometry of Hydrocarbons	Week of April 27
Make-Up Lab for eligible students ONLY – Topic TBD	May 4–6

PreLab HW Dates

All HW due by 10:00 PM on LON-CAPA

PreLab HW For	Due Week Of
Lab 1 (Lab Safety)	February 3
Lab 2 (Kool-Aid)	February 10
Lab 3 (Aspirin Spec)	February 17
Lab 4 (Aspirin Acid)	February 24
Lab 5 (Buffers)	March 2
Lab 6 (pK_a Aspirin)	March 9
Lab 7 (Free Energy)	March 23
Lab 8 (Electrochem)	March 30
Lab 9 (Kinetics – diff.)	April 6
Lab 10 (Kinetics – int.)	April 13
Lab 11 (Hydrolysis)	April 20
Lab 12 (Geometry)	April 27
Make-Up Lab	May 4–6

PostLab HW Dates

All HW due by 5:00 PM on LON-CAPA

PostLab HW For	Due Week Of
Lab 1 (Lab Safety)	February 10
Lab 2 (Kool-Aid)	February 17
Lab 3 (Aspirin Spec)	February 24
Lab 4 (Aspirin Acid)	March 2
Lab 5 (Buffers)	March 9
Lab 6 (pK_a Aspirin)	March 23
Lab 7 (Free Energy)	March 30
Lab 8 (Electrochem)	April 6
Lab 9 (Kinetics – diff.)	April 13
Lab 10 (Kinetics – int.)	April 20
Lab 11 (Hydrolysis)	April 27
Lab 12 (Geometry)	May 4
Make-Up Lab	May 4

** NOTE: The PostLab assignment for Lab 12 The Geometry of Hydrocarbons and the Make-Up Lab are DUE on or before Reading Day, May 7. **

Preface

Welcome to Chemistry 105! This course is an introduction to the chemistry laboratory at the college level. You will complete twelve chemistry experiments in the laboratory designed to help you better understand the chemistry you are learning or have learned in Chemistry 104 or a similar course. You will do some deducing, as you determine the identity, composition, or qualities of several systems or chemicals.

This manual is designed to help you on your way in Chemistry 105. Its aim is to guide you through the experiments you will undertake and help introduce you to several topics, techniques, and principles of chemistry. The experiments are intended to introduce you to laboratory work and it is our hope that you will find these laboratory experiences challenging and interesting.

Finally, we understand that our students are coming to us with different levels of experience in the lab. The teaching staff and Course Coordinator welcome your concerns and questions, whenever they arise throughout the semester.

Chemistry 105 Course Policies

You must read this section before coming to your first scheduled laboratory period.

CHEMISTRY 105 ONLINE

It is extremely important for you to familiarize yourself with the Chemistry 105 website. From this website you can access your schedule, the online gradebook, and the work you need to submit for the course.

We suggest you go to the website as soon as possible.

To access the course website, go to <http://chem.illinois.edu> then go to “Course Web Sites” and then to “Chemistry 105”. You will find the following sections in tab-format on the website. Each section is summarized below; however, you are encouraged to familiarize yourself with them online. You will also need to complete the first online assignment, located in LON-CAPA (<https://lon-capa.illinois.edu>) **before** the first lab. You will use LON-CAPA often this semester, so it is a good idea to take a few minutes to familiarize yourself with this website, as well, before the semester begins.

1. Contact Information. This tab provides you with the e-mail addresses of all of the TAs (along with the sections each teaches) and the e-mail address of the Course Coordinator and the Lab Coordinator.

2. Syllabus. This tab provides you with the schedule for the semester for each section. The specific schedule depends on the day your lab meets. Go to your particular syllabus and **print it out**. You will then have the schedule for the date each lab meets, along with due dates for all online assignments.

3. LON-CAPA Assignments. This tab allows you to access all online assignments. You will have to complete a PreLab assignment before each lab, enter data during your lab session, and complete a PostLab assignment (which includes data analysis) after each lab. These assignments are described in more detail in *Required Components of the Course* (next) and the due dates for these are given in the Syllabus. Clicking on the LON-CAPA Assignments link will bring you to the login page for LON-CAPA. Enter your NetID as your login and enter your password (this is your Active Directory password). The online assignments can be found by clicking the *Course Contents* button at the top of the page.

The Course Websites page has help in logging on to LON-CAPA. If there are additional problems, please contact your TA or the Course Coordinator or the Lab Coordinator.

4. Online Grade Book. This link takes you to the Chemistry 105 grade book in Atlas. This provides you with scores for all Chemistry 105 assignments. You will want to check this periodically throughout the semester to make sure the grades are entered correctly.

Instructions and a sample for calculating your grade can be found in the Frequently Asked Questions section on pages xxv–xxix.

REQUIRED COMPONENTS OF THE COURSE

1. PreLab Assignments. These assignments have been developed to make sure that you understand the concepts and the calculations involved in the lab experiments. These are found online via LON-CAPA and must be completed by 10:00 PM on the evening **before** the corresponding lab (see the online Syllabus for the schedule). You will get immediate feedback concerning your answers, and before the deadline multiple attempts are allowed. By reading the lab manual and having perseverance, there is no reason to not earn all possible points for the PreLab assignments. Again, the point is to do this before the lab, so once the deadline has passed your access to the PreLab will be closed and will not be re-opened.

2. Laboratory Reports. There are twelve labs throughout the semester (see the online Syllabus for the schedule). Make sure to have your Laboratory Note pages prepared for data recording and analysis. See *The Laboratory Notebook* for information on preparing the notebook.

You are required to attend all laboratory periods. During the lab you will carry out the experiment, record your data in your laboratory notebook, and record your data in your LON-CAPA account. When you have completed the aforementioned tasks, you are expected to remain in the lab and complete as much of your PostLab as is possible with the remaining time. Students may only leave the laboratory early if their TA has verified that they have completed all of the PostLab questions.

You are not excused from the lab unless the reason falls under one of the categories described in *Attendance for the Course*. Two important points about missing the lab:

- Even if you are excused from a lab, you must still complete the online PreLab and PostLab assignments by their regularly scheduled due dates.
- Any student who misses more than three laboratory periods (excused or not) during the semester will automatically fail the course or receive an incomplete grade for the course if required reasonable excuse letters have been provided.

You may be familiar with LON-CAPA as a homework/quiz system. As such a system, LON-CAPA checks your answers and either provides you with immediate feedback, allowing you to change your answer (like the PreLab assignments) or accepts your answer and evaluates it after the due date, and credit is earned based on the correctness of your response (like the PostLab assignments). For data entry it is a bit different because LON-CAPA is not connected to a probe that gathers your data so it has no way of knowing if what you enter is correct. You need to make sure you are entering the correct data as it will be used for subsequent calculations in the PostLab.

A few points about LON-CAPA data entry:

- **In the lab LON-CAPA accepts answers that may not be correct.** That is, you may make an error in the lab and get a poor result and LON-CAPA accepts it. This does not mean it is correct, even if accepted. In addition, you may measure a temperature as 25.2°C, for example, and enter it as 2.52°C. LON-CAPA will accept it because there is no way to know that you entered the value incorrectly. We sometimes put ranges of acceptable answers (for example, we may only accept temperatures between 0°C and 100°C for aqueous solutions). But do not think that just because data are accepted that they are correct. LON-CAPA does not know what you have measured and it is being used merely as data entry.
- **You cannot change data once you submit them.** Write your data in your tables in your laboratory notebook. Check to make sure what you have typed into LON-CAPA is correct

and consistent with what is in your notebook before you hit the submit button. You may lose points on the PostLab because of poor data, even if it was accidentally entered. If your goal is to hurry to get out of lab you will make a mistake. If your goal is to do it right, you will do it right, and you will still get out on time. We cannot change your data or clear your data once you submit it, so be careful.

- **Write everything in your laboratory note pages.** Do calculations in the notebook as well so that if you have questions later you can find what data you had and what you did with it. There will be at least one occasion where you will need data from a previous lab.
- **Wait until you have gathered all of your data before submitting any into LON-CAPA.** If your results are inconsistent or obviously in error, you should re-do any trials as needed before entering data.
- **In order for your PostLab to open, you must enter accepted data** (that is, to the correct number of significant figures and within any ranges that are set). You will get a message if not accepted, but be careful and take your time. Look to make sure your data are accepted.
- **We expect students to stay in the lab room for the entire lab period.** You may leave early only if you have completed the PostLab questions for the experiment. If you leave lab early before you have finished your PostLab questions or without the consent of your TA, we will assume you are committing academic dishonesty and you will earn a zero for the lab and PostLab questions.

3. Safety Assignments. Safety is an important component to Chemistry 105. These assignments are designed to build upon your existing knowledge of proper lab attire and increase your awareness of safety terminology, pictograms on chemical labels, and general safety practices. Background information and instructions are found within your lab notebook.

These safety assignments will be completed concurrently with **some** of the laboratory experiments this semester and will be recorded in LON-CAPA during your specified lab period. Access to these assignments will not be allowed before or after your specified lab period; therefore, they should be completed **BEFORE** you begin the PostLab Assignment to ensure you complete them in time. It is important, however, to make sure you can open the PostLab Assignment in LON-CAPA before you leave the lab, even if you will not have time to work on the assignment in the lab.

4. PostLab Assignments. These assignments consist mainly of calculations and data analysis of what you have done in lab. For some labs there will be some additional questions. If you have an excused absence, data will be provided for you to complete the assignment as scheduled. If you have an unexcused absence, you will **not** be able to complete the PostLab assignment or safety activity. The PostLab assignments are found online via LON-CAPA and must be completed by 5:00 PM the evening **before** your next lab (see the online Syllabus for the schedule). Before the deadline multiple attempts are allowed but there is generally no feedback until after the assignment is due. Once the deadline has passed, your access to the PostLab assignment will be closed and will not be re-opened.

All lab data must be correctly entered and accepted by LON-CAPA in order for the PostLab to open. Students should verify that their PostLab opens (by physically opening it while in the lab) before they leave the lab. Lab data cannot be re-entered or manipulated after the assignment closes at the end of the lab period, so all errors must be identified and corrected before the student leaves the lab. Failure to correctly enter and submit lab data will prevent the student from completing the PostLab and will result in a grade of “zero” points for the PostLab.

5. Lab Cleanliness. Students are required to work in a clean and orderly manner in the Lab each week. This includes, but is not limited to, cleaning the benchtop area where you have worked with soap and water, cleaning all lab glassware with soap and water and returning it to its proper location, turning off/unplugging/wiping clean all lab equipment that you used (spectrophotometer, hotplate, etc.) ensuring that you left the balances clean, throwing away used weigh boats in the trash, disposing of all waste in the proper receptacle, closing the lids on chemicals before walking away from the balance stations or dispensing stations, and any other requests made by your TA.

At the end of each lab period, your TA will walk through the lab space and ensure that the class has left the space in the proper condition. You will be given points, ranging from 0–1, based on the condition of the lab each week. These points will be assigned to the class as a whole, not to individual students; therefore, it is not only important that you leave your area clean, but that you also encourage those students around you to do the same. 1 point is awarded if the lab space is completely clean and all conditions are met; 0.5 points if 1 or 2 of the conditions are not met; and 0 points if more than 2 of the conditions are not met.

It is important to note that lab cleanliness is not only important at the end of the lab, but also throughout the lab session; therefore, if the Lab Staff observes that students are repeatedly ignoring the instructions of the TA and failing to clean-up messes as they occur, such as walking away from a dirty balance instead of cleaning the spilled chemical first, the Lab Staff will deduct cleanliness points from the class.

6. Policy for Broken Lab Glassware or Equipment. Students will use a variety of glassware and equipment in the Chemistry 103 laboratory. This equipment is expensive and requires careful handling. Broken lab glassware or equipment will incur the following penalty: a loss of cleanliness points for the week during which the breakage occurs. This penalty will be imposed on the individual student, not the lab section as a whole.

In instances where a student breaks glassware or equipment more than once, breaks lab equipment controls (for example the OAS, waste hood or dispensing station), or breaks equipment in a manner deemed potentially dangerous to other individuals in the lab the Course Coordinator and Lab Coordinator reserve the right to enforce a more severe penalty to the student to include, but not limited to, the loss of points related to lab assignments or lowering of a full letter grade.

ACADEMIC INTEGRITY

All answers entered into your LON-CAPA account must be due to your work. While you are encouraged to confer with others (your lab partner, TA, Course Coordinator, etc.), the work you do must be your own.

To be clear, this also means that all data entered into the Lab assignments in your LON-CAPA account must be from the data you collect during your normally scheduled lab time. For example, it is not acceptable to “make-up” data that is accepted into LON-CAPA, or to use data from any other source that you know will work. Again, any data entered must be from you performing the experiment. If you enter any other data, you are guilty of “fabrication of data” (see http://admin.illinois.edu/policy/code/Pocket_Code_web2012.pdf from the Student Code). The penalty for this could be as much as failing the course. That is, if you enter any data that you have not obtained in lab, even

as only part of one experiment, you may receive a grade of “F” for the course. It is therefore also considered cheating if you give your data to a person who is not in lab.

To make sure students who enter data are present in lab, we do take attendance. Make sure that your TA knows you are in lab. Sign-in upon entering the lab, respond when your TA calls your name, and turn in a copy of your lab notebook with the data for that day’s experiment.

There are too many students and too many sections to allow students to switch sections; that is, you must attend the section in which you are enrolled (for an excused absence, see “Attendance for the Course”). Do NOT go to a different section and then submit your data during your scheduled time. You will not be counted as being present in the lab, and if data are entered, they will be considered to be fabricated.

REQUIRED MATERIALS FOR THE COURSE

You are required to purchase the following for Chemistry 105:

1. Lab Coat

A lab coat can be purchased at any of the campus bookstores. Note: students are permitted to purchase and wear either the standard white lab coat or the blue, fire-resistant, lab coat. It is recommended that students who plan to take upper-level (200 and above) lab courses purchase the blue, fire-resistant, lab coats since this is the coat that will be required for those upper-level labs.

2. Goggles

All students, teaching assistants, and visitors in the laboratory must wear regulation safety goggles as required by STATE LAW. You must wear goggles at all times in the laboratory or you will be asked to leave immediately. If you must be reminded to wear goggles in the laboratory, your TA will deduct points from your laboratory grade.

The approved goggles for Chem 105 is: Honeywell Uvex Stealth OTG safety goggle. Other models of goggles are not permitted in the lab. A pair of goggles can be purchased at any of the campus bookstores or online through Amazon. If the bookstore does not have it, this is not a valid excuse to not wear them for lab and you will be asked to leave.

It is strongly advised that you do not wear contacts while in the laboratory. They readily absorb vapors from solvents that are detrimental to the eye. Safety goggles are not “air tight” and therefore do not completely eliminate this absorption. If you choose to wear contacts in the laboratory, you must notify your TA and wear a “*CONTACTS*” badge on your lab coat or apron each week.

3. Chemistry 105 Laboratory Manual “General Chemistry Experiments”

You cannot use an old version of this manual this semester, as the course has been redesigned to include new experiments and policies. You must purchase the current version of the manual.

4. Perforated Carbon Pages

Two pages are provided for your Laboratory Notes at the end of each experiment. See the section entitled *The Laboratory Note Pages* on the following pages for more details.

ATTENDANCE FOR THE COURSE

Students are required to attend all laboratory periods. You must attend the section in which you are enrolled. All absences will be considered unexcused except in the following cases. Excuses must be submitted in a timely manner, as defined as within 6 days after the scheduled experiment.

NOTE: Any student who misses more than 3 laboratory periods (excused or not) during the semester will automatically fail the course or receive an incomplete grade for the course if required reasonable excuse letters have been provided.

1. **Medical excuse.** You must provide a signed doctor's note from a physician or from McKinley Health Center to the Course Coordinator. "Dial a nurse" or any consultation provided over the phone is not an acceptable medical excuse. Medical excuses must originate from a physical appointment with a physician. This information should NOT be given to your TA.

If you are sick and unable to attend your assigned lab period, please email the Course Coordinator as soon as possible.

2. **Family emergency.** If you cannot attend class because of an unexpected emergency you must provide documentation from the Emergency Dean to the Course Coordinator. This information should NOT be given to your TA.

If you miss a lab due to an emergency, please email the Course Coordinator as soon as possible.

3. **Participation in a University-sponsored activity.** Examples include participation in the Marching Illini or a University sports team. You must provide documentation regarding your absence to the Course Coordinator at least one week prior to your absence. This information should NOT be given to your TA. Intramurals, student-sponsored clubs and activities, or registered student organization (SRO) events are **not** considered University-sponsored and do not excuse you from lab.

The following procedures must be followed for Excused Absences:

1. **The first and second request for an excused absence.**
 - a. Students must provide the necessary documentation to the Course Coordinator within 6 days of the missed experiment. The Course Coordinator will evaluate the documentation and notify the student, via email, as to whether or not their documentation has been approved and if their absence will be excused.
 - b. If the student's absence has been excused, the student will receive simulated data for the Lab Assignment. The student must complete the PreLab and Postlab assignments by their originally scheduled due dates.
2. **The third request for an excused absence: students must attend a make-up lab sessions at the end of the semester (May 4–6 for Spring 2020).**
 - a. Students must provide the necessary documentation to the Course Coordinator within 6 days of the missed experiment. The Course Coordinator will evaluate

the documentation and notify the student, via email, as to whether or not their documentation has been approved and if their absence will be excused.

- b. The student will receive an email from the Laboratory Coordinator with instructions to register to attend a make-up lab session at the end of the semester. Failure to attend this session will result in a grade of “zero” for the PreLab, Lab, and PostLab assignments of the originally missed experiment.
- c. Make-Up Lab Instructions:
 - Students must register to attend a make-up lab sessions **by midnight the Saturday before Make-up Lab week (May 2, 2020 for the Spring 2020 semester)**. Students are encouraged to register for their desired date and time as early as possible in order to ensure their preference will be honored.
 - Students will receive the Lab Experiment document 7 days before their registered make-up lab, unless they register for a session that is less than 7 days from the date of their registration. Note, in the case where a student registers for a make-up session less than 7 days in advance, the student will not be given extra time. For example, if a student registers on Friday, May 1 to attend a make-up session on Monday, May 4; they will only receive the time between their registration and the make-up session to prepare for the lab, not 7 days.
 - All students attending a make-up lab session, regardless of the date and time of the session, must complete the make-up lab PreLab assignment by 10AM on Monday, May 4, 2020. If the student completed the PreLab assignment for the lab experiment they did not attend, the PreLab for the make-up lab will replace this grade.
 - Students are required to arrive to their make-up session on-time, properly dressed and ready to work with a partner that will be selected by the TA overseeing the session. All Safety and I-card Scanning Policies that are in effect during the semester, also apply to the make-up lab sessions.
 - Students are required to complete the Lab Assignment (data entry into LON-CAPA) during their registered make-up session. Data will not be permitted to be entered after the session closes. This grade will replace the grade of the Lab Assignment that was missed and excused by the Course Coordinator.
 - Students are required to complete the PostLab Assignment by 5 PM on or before Reading Day, May 7, 2020. This grade will replace the grade of the PostLab Assignment that was missed and excused by the Course Coordinator.

Students are expected to arrive to lab on-time, properly dressed, and ready to work. The TA will provide general instructions on lab techniques, calculations and safety protocols within the first 10 minutes of the lab session. It is crucial that students are in attendance for these instructions. Students who are more than 10 minutes late to lab, and miss the TA PreLab instruction, will not be allowed to attend lab or perform the experiment. This will result in zero points for the Lab and PostLab Assignments in LON-CAPA.

Students are required to dress properly each time they attend lab. If the student is not dressed properly they will be removed from the lab and will receive a grade of zero for the Lab and PostLab assignments for that particular week.

MANDATORY I-CARD SCANNING POLICY AND PROCEDURE

The Department of Chemistry requires that students scan their official University of Illinois i-card/UIN card upon arrival to lab in order to attend and receive credit for the experiment and receive access to the PostLab assignment. Scanning must occur within the first 10 minutes of the lab period. If a student forgets to scan their card, arrives late, or does not have their i-card/UIN card with them, then they will receive a zero for the in lab experiment, *even if they remain in lab and complete the work*. This policy applies to all students enrolled in CHEM 103 and CHEM 105.

Listed below are frequently asked questions regarding this policy.

1. Why do students need their official University of Illinois i-card/UIN card?

Scanning of official University of Illinois i-card/UIN cards is required for safety purposes and will ensure the student attends the lab section for which s/he is registered.

2. When does the scanning of the card occur?

Each lab contains an i-card/UIN card scanning station. Students will scan their card immediately upon arriving to their Chem 103 or Chem 105 lab. All scanning must occur within the first 10 minutes of the lab period, for example by 8:10:01AM for a lab session that begins at 8AM.

3. What happens if a student does not scan their card by 10 minutes after the start of lab?

Students must scan their card no later than 10 minutes after the start of lab. Any student that scans their card after this time, or fails to scan their card at all, will receive a zero for the lab experiment.

For example, a student is registered for the Tuesday 8AM lab session. This student must scan their official University of Illinois i-card/UIN card by 8:10:00AM. If the student scans their card at 8:10:01AM, their scan will be considered late and they will receive a grade of “zero” for that week’s experiment.

Note: What happens if a student does not scan their card by 10 minutes after the start of lab, but remains in the lab and completes the experiment?

Students who fail to scan their card by the 10-minute mark of the lab session, will receive a grade of “zero” for the experiment, **EVEN IF** they attended lab anyway and completed the work. In these cases, the course instructor will manually replace whatever grade they obtained on the lab experiment with a grade of “zero” because the student did not fulfill the requirements of this policy.

4. What will happen if a student forgets their i-card or has a temporary ID?

A temporary ID card cannot be used instead of an i-card to check into the lab.

The student should report directly to the office of the Teaching Laboratory Coordinator (3015 Chemistry Annex) to report that s/he forgot their i-card.

Please note, this option does not change or extend the time by which the student must arrive to the lab space. Arrival to the lab space must still occur before the 10-minute mark of the lab.

For this option, the Teaching Laboratory Coordinator will record the following information: student name, NetID, Section Number and verify that this is the first time the student has tried to attend lab without their card. A message will then be sent to the student's TA alerting him/her that the student will be allowed to attend lab without their card this ONE TIME. **This allowance will only be made one time per student per semester.**

If the student chooses this method, s/he will not be permitted to begin work on the experiment until their TA has received a message stating that student has been approved to attend lab and receive credit for the experiment, for this one and only time, without his/her i-card. If the student misses the pre-lab instruction during this process, the TA will provide the student with this information, before s/he is allowed to begin working.

All subsequent instances when the student reports their card as misplaced, lost or stolen, will result in the student receiving a grade of "zero" for the lab experiment and PostLab assignment. It is the responsibility of the student to go to the Illini Union Bookstore and replace his/her i-card before trying to gain access to the lab again. Student must present their new official University of Illinois i-card/UIN card the next time they attempt to access the lab.

5. What will happen if a student misplaces, loses or has had his/her i-card stolen?

The student should report directly to the office of the Teaching Laboratory Coordinator (3015 Chemistry Annex) to report that s/he misplaced, lost or had their card stolen. The Teaching Laboratory Coordinator will record the following information: student name, NetID, Section Number and verify that this is the first time the student has tried to attend lab without their card. A message will then be sent to the student's TA alerting him/her that the student will be allowed to attend lab without their card this ONE TIME. **This allowance will only be made one time per student per semester.**

Please note, this option does not change or extend the time by which the student must arrive to the lab space. Arrival to the lab space must still occur before the 10-minute mark of the lab.

If the student chooses this method, s/he will not be permitted to begin work on the experiment until their TA has received a message stating that student has been approved to attend lab and receive credit for the experiment, for this one and only time, without his/her i-card. If the student misses the pre-lab instruction during this process, the TA will provide the student with this information, before s/he is allowed to begin working.

All subsequent instances when the student reports their card as misplaced, lost or stolen, will result in the student receiving a grade of "zero" for the lab experiment and PostLab assignment. It is the responsibility of the student to go to the Illini Union Bookstore and replace his/her i-card before trying to gain access to the lab again. Student must present their new official University of Illinois i-card/UIN card the next time they attempt to access the lab.

GRADING FOR THE COURSE

Please note: Chemistry 105 follows the University plus/minus system for grading.

The grading for the course will be as follows:

Safety Video Quiz	5 pts.
Safety Feature Scavenger Hunt	5 pts.
Waste Disposal Activity	5 pts.
12 PreLab Assignments	180 pts.
12 Lab Reports*	120 pts.
11 PostLab Assignments	220 pts.
4 Safety Assignments	20 pts.
12 Lab Cleanliness (up to 1 point each)	12 pts.
Total	567 pts.

*Lab reports consist of you entering data into your LON-CAPA account during lab, and turning in a copy of your data and observations to your TA. Unless you have an excused absence, both of these must be completed for you to receive credit for the lab report and access to and credit for the PostLab assignment.

This course is not curved (i.e. 70–72% is a C–, 73–76% is a C, 77–79% is a C+, 80–82% is a B–, 83–86% is a B, 87–89% is a B+, 90–92% is an A–, and 93–100% is an A).

Grading Scheme for Chem 105:

Percentage %	Final Grade
(97.0–100.0%)	A+
(93.0–96.9%)	A
(90.0–92.9%)	A–
(87.0–89.9%)	B+
(83.0–86.9%)	B
(80.0–82.9%)	B–
(77.0–79.9%)	C+

Percentage %	Final Grade
(73.0–76.9%)	C
(70.0–72.9%)	C–
(67.0–69.9%)	D+
(63.0–66.9%)	D
(60.0–62.9%)	D–
(0.0–59.9%)	F

OTHER IMPORTANT COURSE INFORMATION ITEMS

1. Medical Insurance

Each student at the University is responsible for providing his/her own medical insurance coverage. If a student is injured or becomes ill during laboratory, costs of transportation and treatment are the responsibility of the student. Check to be sure that your insurance coverage is adequate.

2. Contact Information

If you have any questions or concerns throughout the semester, you should contact the Course Coordinator or Laboratory Coordinator. The contact information is included online.

THE LABORATORY NOTE PAGES

You will keep a record of each experiment you complete in the laboratory note pages found at the end of each experiment. At the end of each laboratory period you will submit the original record to your TA and keep the copies of these pages in your manual for your records and for use on the PostLab assignments. Failure to submit your data sheet at the end of your lab period will result in a loss of cleanliness points for that week of lab.

Record tables, data, and observations in ink—pencil will not be accepted. The record of each experiment should be in a format that allows convenient organization of pertinent data and observations. Carefully read the entire experiment before coming to lab. This will help you visualize the purpose and procedure and organize your work.

You should prepare the laboratory note pages before coming to lab. The report for each week's experiment should begin at the top of a new page. The following should be completed before you come to lab:

- Include the title of the experiment at the top of the first page along with your full name and date.
- Reproduce all of the data tables for the experiment.
- Include any calculations described in the *Before Coming to Lab* section of the particular experiment.

FREQUENTLY ASKED QUESTIONS FOR CHEMISTRY 105

1) What should I do if I missed my scheduled Lab and am seeking to be excused?

Please read the Course Attendance section on pages xix–xx of your lab manual to ascertain types of situations that will allow you to be excused from lab.

If you missed lab due to one of these allowed situations, i.e. you have a legitimate excuse for missing lab, then contact the Course Coordinator and provide the reason why you missed Lab, the actual name of your section and provide the documentation that supports the reason that you missed Lab so you can earn an excused absence from that Lab.

The documentation sent can be a pdf, a clear scanned image of the document(s) or a very clear picture of the document(s).

The latter things must be sent to the Course Coordinator in a reasonable time, i.e. no less than 24 hours BEFORE the deadline for the PostLab of the lab missed.

Failure to submit the latter items to the Course Coordinator in a timely manner means that student will earn an unexcused absence for the Lab they missed. Please note that McKinley notes MUST confirm that you visited McKinley and saw a health practitioner if this form of documentation is being used to earn an excused absence from the Lab missed. Dial-a-nurse or other phone consultations are not valid forms of medical excuses.

2) What does receiving an excused absence from Lab means?

It means that the average grade of all of the Labs that student actually completes will be used in place of that excused absence when calculating that student's grade.

The student will see EX in the online grade book for the Lab grade if they have been excused absence from Lab.

When a student is excused from Lab they must still complete the PostLab for that lab by the deadline for their section. Simulated data will be generated and provided in LON-CAPA, once the lab excuse is granted.

PostLabs nor PreLabs are excused for this course unless there is documentation provided that supports that the student was incapacitated and thus unable to do either one or both of these assignments **for the entire time** the assignment(s) was open in LON-CAPA.

3) How do I calculate my point total for one Lab?

Grades for this class, the points/grades that are used to calculate your grade, are NOT kept in LON-CAPA and are NOT the same grades as those seen in LON-CAPA.

The grades/points used to calculate your grade are kept in the online gradebook and are taken out of LON-CAPA and converted to scores out of 10 for PreLabs, 10 for most Labs and 20 for PostLabs.

Here is an example of how to calculate the different parts of your Lab each week:

I will use the different components of Lab 2 for this example:

PreLab 2:

For PreLab 2, assume for the purpose of this sample calculation, there were 15 questions asked in LON-CAPA and a student correctly answered 13 of them.

The student therefore earned 13 out of 15 for PreLab 2 in LON-CAPA.

All PreLabs are each worth 10 points.

To convert 13/15 to a score out of 10, multiply both 15 and 13 by (10/15).

When this is done the student, therefore, earned 9/10 (grades are rounded to the nearest whole number) for PreLab 2.

This student will see 9/10 in the online gradebook for their PreLab 2 grade and 9/10 will be used to calculate their CHEM 105 grade.

Lab 2:

For Lab 2, assume for the purpose of this sample calculation, there were 4 questions asked in LON-CAPA and a student correctly answered 4 of them during their 2 hour lab period in their assigned lab space.

The student therefore earned 4 out of 4 for Lab 2 in LON-CAPA.

Lab 2 is worth 10 points.

To convert 4/4 to a score out of 10, multiply the numerator and denominator, i.e. 4 by (10/4).

This gives you an answer of 10/10.

This student will see 10/10 in the online gradebook for their Lab 2 grade and 10/10 will be used to calculate their CHEM 105 grade.

PostLab 2:

For PostLab 2, assume for the purpose of this sample calculation, there were 14 questions asked in LON-CAPA and a student answered 7 of them correctly.

The student therefore earned 7 out of 14 on PostLab 2 in LON-CAPA.

All PostLabs are out of 20 points.

To convert 7/14 to a score out of 20, multiply both 14 and 7 by (20/14).

This student will see 10/20 in the online grade book for their PostLab 2 grade and 10/20 will be used to calculate their CHEM 105 grade.

4) How are lab cleanliness points awarded?

During the Lab the TA and the Lab Staff will regularly check the condition of the lab space and evaluate whether or not students are working in a clean and orderly manner. Failure to, for example, close chemical lids at the balance stations, close waste container lids in the waste hood, or clean up chemical spills at the balance, will result in a loss of cleanliness point.

At the end of each lab session, the TA will complete a final walk-through of the lab space and check the condition of the lab. The following items are assessed,

- Are the waste containers open?
- Are the reagent containers open?
- Are there glassware, weigh boats, or other equipment left on lab counters or in sinks?
- Are the balances and areas around the balances clean?
- Is there broken glassware left in the sinks, on the floor, or at the work stations?
- Are there weigh boats that contain chemicals left anywhere in the lab space?
- Are there cuvettes left in the spectrometers?
- Have the lab counters been cleaned and dried?
- Is there garbage in the sinks or on the lab counters?
- Has all used glassware been washed with soap and returned to their proper bins?

Points are assigned to the class as a whole, not to individual students based on the following criteria: 1 point if the lab space is complete clean and all of the above listed conditions are met; 0.5 points if 1 or 2 of the above listed conditions are not met; 0 points if more than 2 of the above listed conditions are not met.

Individual students within a lab section may receive an assignment of “zero” for lab cleanliness if lab equipment or glassware is broken during a lab period.

5) What does completing the Lab in LON-CAPA to gain access to the PostLab mean?

Each Lab for this course occurs over a 2 hour period. For each lab, students must enter accepted lab data for ALL questions for that lab using LON-CAPA during this 2 hour period.

Students who fail to do the latter will be unable to access the PostLab exercise (worth the bulk of the grade) for that Lab.

Students will NOT be given access to the PostLab in LON-CAPA for any lab that they failed to submit accepted lab data for all questions for that Lab during the 2 hour period in their lab space for that lab.

6) How many times can I miss Lab for the semester?

Any student who misses more than 3 laboratory periods (excused or not) during the semester will automatically fail the course or receive an incomplete grade for the course if required reasonable excuse letters have been provided. Please note that an unexcused absence DOES mean that the student loses points for the lab they missed, as well as the PostLab for that lab.

Why does the student lose points for the PostLab too? The opening of a PostLab in LON-CAPA for each lab is dependent on a student entering acceptable data for ALL questions during their two hour assigned lab period, in their assigned lab space.

If a student has not been excused from lab, they therefore also forfeit their PostLab points for that lab as well as they will not be given access to the PostLab with an unexcused absence for a Lab.

7) What happens if I forget my lab coat/goggles or if I am not dressed properly?

Students are required to wear a lab coat and approved safety goggles (also referred to as personal protective equipment or PPE), in addition to dressing properly each time they attend lab. The specific details for these items are listed in the “Laboratory Conduct and Safety” section on page xxxi of the lab manual and in the course safety video that students are required to watch before participating in the first experiment of the semester.

Each student is checked for proper dress and PPE by both the TA and a member of the lab staff. This typically occurs within the first 20–30 minutes of lab. If the student forgets their PPE or is not dressed properly, s/he may not attend lab and will receive a zero on their Lab and Postlab assignments for that week of lab.

8) What happens if I arrive after the first 10 minutes of lab?

Students are required to be in lab, properly dressed, including proper PPE, ready to work and with their i-card scanned (see I-Card Scanning Policy on pages xxi–xxiii of the lab manual), by the 10-minute mark of the lab in order to attend lab for a grade and have access to the PostLab. For example, for a 10AM lab, a student must meet these requirement by 10:10:00AM. If any of these requirements are met at or after 10:10:01AM, the student will not be allowed to attend lab for a grade and will receive zero points for the lab and PostLab assignments in LON-CAPA. This will count as an unexcused absence for the student.

9) Is this course curved at the end?

No. Students must earn the point total that is stated under “Grading for the Course” in the Lab manual to earn the grade they desire for this course.

10) How does the online grade book use an excused absence grade to calculate your point total?

If you have an EX grade in the gradebook for a lab then the following formula is used by the grade book to calculate the number of points for that excused assignment:

EX = excused assignment = ((sum of all student’s non-excused scores for that kind of assignment) / (sum of all student’s non-excused possible points for that kind of assignment)) * (possible points the excused assignment is worth)

