

Principles of Chemistry I Lab

Course: CHEM 1211K lab, CRN 94052/87862
Semester: Fall 2021
Instructor: Dr. Joan Mutanyatta-Comar
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Pre-lab lecture: T 9:00 am – 9:45 am. **Natural Science Center (NSC) 218**
Lab: T 9:55 am - 12:00 pm. **Natural Science Center (NSC) 234**
Office hours: T 3:30 pm – 4:30 pm (via Webex). Any other time by appointment. If you wish to have an in-person meeting, please email me and we will schedule a meeting.

Text: “The Identification of an Organic Acid” GSU Lab Manual
(Included in the price of supply card).

Communication

Please send emails to me from your GSU e-mail account, (e.g., jcole1@student.gsu.edu). Please put the course name in the subject of your email. (**Please do not email me from iCollege**)

Course Description

Principles of Chemistry I Lab is the first lab in a two-semester sequence covering the fundamental principles and applications of chemistry for science majors. The purpose of this chemistry laboratory is to provide the key knowledge base and laboratory resources to prepare students for careers as professionals in the field of chemistry, for graduate study in chemistry, biological chemistry and related fields, and for professional school including medical, dental, law and business programs.

****Please do note that this syllabus reflects a plan for the semester. Deviations may become necessary as the semester progresses.****

Learning outcomes

Students in this laboratory will:

- Demonstrate the ability to safely and effectively perform various experiments using proper glassware set-up, handling of hazardous chemicals, and following the prescribed experimental procedures.
- Demonstrate mastery of basic chemistry laboratory techniques, including recrystallization, filtration, titration, and melting point determination.
- Gain an understanding of how to critically analyze experimental data in comparison to literature data.

- Demonstrate their ability to effectively communicate scientific results by writing a final laboratory report.

List of Experiments

Part I:

Experiment: Determination of density of an unknown liquid

Equipment: Graduated cylinder, pipet, buret, one-place balance, four-place balance (analytical balance)

Part II: Identification of an unknown organic acid

Experiment 1: Recrystallization of an unknown organic acid + % yield determination

Experiment 2: Determination of melting point of the unknown organic acid

Experiment 3: Determination of Equivalent Weight

- a) Preparation of ~0.1 M NaOH
- b) Titration of HCl with NaOH
- c) Titration of potassium acid phthalate (KHP) with standardized NaOH
- d) Titration of unknown organic acid with standardized NaOH

Experiment 4: Computer search

Experiment 5: Determination of pK_a of the unknown organic acid

Experiment 6: Sodium fusion

Grading: (taken from the GSU lab manual)	<u>Max. Credit</u>
Final Exam	45*#
Final Report (Quality)	30*#
Quality of Notebook (in ink)	10*
Homework and Quizzes	15
Density Report	10*
Identification of Unknown Acid (data in Final Report)	5*
Recrystallization and Yield Calc.	10
MP (range and standards)	20*
EW, <u>M</u> , HCl & NaOH w/error anal.	35*
Computer Search and Analysis	5*
Sodium Fusion and pK _a	<u>15</u>
TOTAL (Maximum)	200^

Note: Assignable points on each item are twice the credit so that students can receive more partial credit. For Example: Final Exam questions will be graded on a 90 points scale. The final score will be divided by two for actual credit. Thus, the total maximum assignable points of 400 is equal to 200 credit points.

*These eight starred items are required to be completed before total points will be assigned.

#The Final Exam, Final Report & lab notebook will NOT be returned. They will be available for viewing and discussion in the lab instructor's office. They may not be removed. After two semesters, they will be destroyed.

^ **Lab Credit:** 25% of total course credit; No formal "grade" for 1211K Lab will be recorded, instead, the students' credit based on a maximum of 200 will be combined with those of the lecture portion of the course and a Chem 1211K overall grade will be assigned.

Note: Incomplete lab work (if excused) will result in the assignment of a grade of "I" if the student is passing the lecture portion, otherwise, a grade of "F" will be assigned.

Notes:

- 1. Pre-lab and lab are a single unit, for safety and operational reasons pre-laboratory attendance is mandatory. Any student who misses pre-lab will not be allowed to attend the laboratory session for that day. Students who miss more than two labs (unexcused absences) will get a 5% penalty of the overall lab grade for each absence over two. If you miss the first three or more labs you will be dropped from the lab.**
2. The laboratory manual will be provided to you on the first day of lab.
3. Attendance to **pre-lab lecture** and **lab** will be recorded (sign-in/out of lab required). Absences can result in loss of points and lower grades.
4. **Bound lab notebooks** are required the first day of lab. Leave the first two pages of the notebook blank for the Table of Contents. All pages must be numbered and dated. All entries/data **MUST be recorded in ink** directly in the notebook at the time the experiment is being carried out. Do not write on other pieces of paper and transfer data to the notebook. Do not tear out pages or whiteout data. Instead, cross-out the incorrect data and present corrected data on another blank page. Notebooks will be checked regularly by TAs and instructors. Notebooks must be submitted with the Final Report. **Please see further details about lab notebook format in the lab manual/lab notebook format document sent to you by email.**
5. **Safety glasses/goggles** and a lab apron must be worn all the time during lab. These may be purchased at the GSU bookstore, the Georgia Bookstore, most hardware stores, or from the Lab Coordinator by filling out a breakage form in the lab. Students who obtain glasses in the latter manner will pay for them at the time they check-out of the lab. Students who are unable or forget to bring their safety glasses/goggles will not be permitted to carry out an experiment.
- 6. Students must bring safety glasses/goggles and closed toe shoes on the first day of lab for check-in. Also, for your own safety, no shorts or sleeveless tops are permitted during lab sessions.**
7. Cleaning up is part of the lab session. Students should stop working and begin cleaning up their work area no later than 20 minutes before the conclusion of the lab session.
8. If you are transferring a lab grade from a previous semester, please fill out a "Lab Grade Transfer Form" and inform the lab instructor.

9. Failure to follow safety procedures will result in expulsion from that lab session with no make-up allowed and loss of credit.
10. Final Report and Final Exam grades will not be posted on iCollege. But you can come and see your report and exam in my office.
11. Final letter grades are only available on PAWS/GoSolar. They will not be posted on iCollege. Please note that grades cannot be given to students by phone, or email.
12. **No make-up for Final Exam**
13. If you decide to withdraw from the course, you must withdraw from both the lecture and the lab. You cannot drop one and keep the other. **October 12, 2021 is the semester mid-point for students to withdraw from the course and received a grade of 'W'.**

Important Dates

August 31 st	Lab begins
October 12 th	Last day to withdraw with a grade of "W"
November 30th	Final Exam: Tuesday 9:00 am – 10:00 am (NSC218)

Class Preparation and Attendance

- ✓ Students are expected to attend all laboratory sessions.
- ✓ Every effort should be made to arrive on time, as important pre-lab advisories will be given at the start of each session.
- ✓ The student is individually responsible for the timely completion of all assignments, regardless of any reason of absence.
- ✓ Reading assignments, which will be given in lecture, should be completed prior to the following lecture and will constitute the quiz material.

Keys for success in a chemistry lab

Students who do well in this course possess the following characteristics:

- **Attend pre-lab lecture and lab:** There is a very good correlation between class attendance (on time) and how well a student will do in this course.
- **Are prepared:** You will get the most out of class if you have reviewed the experimental procedures before coming to each pre-lab session, please see tentative schedule on the next page.
- **Ask questions:** If you don't understand something, ask the instructor in class, during lab, after class, or during office hours.
- **Collect all graded quizzes and homework.** They go over the questions they got wrong and ask the instructor for clarification. This way they don't make the same mistake again.

Tentative Laboratory Schedule

The lab/lecture schedule listed in the GSU, Chemistry Department laboratory manual will be adhered to as far as is possible. Below is a detailed, tentative schedule.

Pre-lab Lecture & Lab Dates	Tentative Pre-lab Lecture Emphasis and lab work	Reading Assignments: Read the experiment in the lab manual before the next lab session
August 31	Objectives of the course, Safety Video, Check-in	Determination of Density of an unknown liquid. Watch videos sent to your email (how to use a graduated cylinder, a pipet, a buret, and an analytical balance).
September 7	Safety Quiz, Determination of Density of an unknown liquid	Identification of Unknown Organic Acid: Recrystallization experiment.
September 14	Complete density experiment; Begin term project: Identification of Unknown Organic Acid: Recrystallization experiment.	Determination of melting point, calculation of %yield, determining solubility of an unknown acid.
September 21	Submit density report; melting point and %yield of recrystallized unknown. Melting point of unknown carboxylic acid and solubility of unknown acid.	Preparation of ~0.1 M NaOH Watch a video sent to your email: acid-base titrations Titration: HCl with NaOH
September 28	Preparation of ~0.1 M NaOH Titration: HCl with NaOH	Watch a video sent to your email: acid-base titrations Titration: KHP with NaOH
October 5	Titration: KHP with NaOH	Determination of equivalent weight: Titration of unknown organic acid with NaOH
October 12	Last day to withdraw and get "W"	
October 12	Quiz 1 [definitions (precision, accuracy, random errors, systematic errors, density), m.p, recrystallization, %yield calculation]. Homework 1 Assignment Determination of equivalent weight: Titration of unknown organic acid with NaOH	Computer search

October 19	Homework 1 Due Computer search for possible identity of your unknown organic acid Make up lab week	pKa titrations
October 26	Start pKa titrations	pKa titrations
November 2	Quiz 2 (calculations: molarity of HCl, NaOH, calculation of equivalent weight) pKa titrations continued Submit your name for Na fusion	Sodium fusion Start writing final lab report
November 9	pKa titrations continued Sodium fusion	Study for lab final; continue writing final lab report
November 16	Finish pKa titrations and sodium fusion Check-out from lab Last week to complete all experiments	
November 30	Lab Final Exam: 9:00 am -10: am (NSC 218) Submit Final Report and Lab Notebook Complete check-out, if not done yet	

Course Policies

There are several policies that seem to work well in this course. Please review these very closely. You will have an opportunity to voice your opinion on these policies and other aspects of the course during office hours.

Wearing Masks in Class

You are encouraged to wear a face covering in all class meetings. I know that face masks may make some aspects of class more difficult. It will be harder for us all to project our voices and read each other's facial expressions. However, I am willing to sacrifice these elements since wearing a mask is one thing I can control to support the health and safety of our community. Be aware that wearing face mask is not required by GSU, so there is no penalty if you choose to not wear a mask. Our university community has a strong tradition of upholding the value of mutual respect, we therefore ask students to not engage in behavior that would be disruptive if your fellow students make a different choice about wearing masks. If you have concerns, please discuss them with me and I will work to the best of my ability to provide a comfortable environment conducive to student learning.

Attendance Policy

Class will never be cancelled unless an official from the Chemistry Department gives the class personal notification. Don't assume a note to be enough without checking the Department's office.

The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or his designee)

1. Give a **WF** to all students who are on their rolls but are no longer taking the class and
2. Report the last day the student attended or turned in an assignment. Students who are withdrawn may petition the Departmental Chair for reinstatement into their classes.

Students who want to do well in this course will attend class following the class attendance policy. You will need an excused absence due to illness. GSU has a new process for students seeking excused absences through the Dean of Students Office. Please submit documentation to <https://deanofstudents.gsu.edu/student-assistance/professor-absence-notification/>. I will then be notified by the Dean of Students of any excused absences.

Should a student test COVID positive, any accommodations to the class attendance policy will be informed by evolving guidance from the CDC on quarantine. In most cases there will be no major change to mode of course delivery, so students will be responsible for collecting notes for missed in-person classes and making up any work they miss during quarantine. Anyone who has a positive COVID test is encouraged to alert the university so that appropriate contact tracing can be conducted.

Reporting a Positive COVID-19 Test

Students, staff and faculty with a positive COVID-19 test are strongly encouraged to report it to <https://cc-gsu.force.com/s/> to allow for contact tracing on campus.

Make-up Assignment, Quiz and Exam Policy

If for some substantial reason you cannot submit an assignment, take a quiz or an exam at the scheduled time, please feel free to contact me by email prior to the due date, or exam date.

Athletes

If you are an athlete, please email me proper documentation, BEFORE you leave for a game/tournament to be able to make-up the work for that week.

Religious Holy Day

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent for the observance of a religious holy day shall be allowed to take a quiz, an exam or complete an assignment scheduled for that day within a reasonable time after the absence.

Grades Policy

If you have any concerns about the way your assignment, quiz or exam was graded, for example, if you believe your answer is correct and it was graded wrong, please feel free to email me and I will take a look at your answer. I strongly encourage every student to look at all graded assignments, quizzes and exams. Please email me to schedule a meeting to go over all the questions you may have not answered correctly. This is good practice to make sure you do not get the same concepts incorrect on the next quiz/exam.

Final letter grades will only be available on PAWS/GoSolar. They will not be posted on iCollege. Please note that grades cannot be given to students by phone.

Course Evaluation

Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation.

Academic Honesty

Chemistry Departments Student Integrity Policy: The Department of Chemistry follows the University policy on academic honesty published in the "Faculty Affairs Handbook" and the "On Campus: The Undergraduate Co-Curricular Affairs Handbook".

Cheating: "Cheating" is defined as unauthorized help on an examination or assigned course material. Taking pictures or screenshots and sharing these is considered cheating. A student must not receive from any other student or give to any other student any information, answers, or help for a class assignment. A student must not "borrow" the answers or data from another student. A student must not use any sources for answers during a quiz or exam (including, but not limited to: notes, books, electronic devices or online sources) without prior authorization from the instructor. A student must not obtain quiz/exam questions illegally, tamper with the exam questions, nor change the results of an exam after it has been graded. Students shall have the right to contest a cheating claim. The appeals process is specifically defined in the student handbook.

All homework assignments, quizzes and exams taken must represent the student's individual, unaided effort.

- 1) Unauthorized sharing/collaboration/plagiarism on assignments using any means including social media/group messaging apps such as GroupMe or Slack constitutes

academic dishonesty and will be reported as such to the Department's Chairman and the Dean's office for appropriate action. Incidents of unauthorized sharing/collaboration/plagiarism will result in zero for that assignment.

- 2) KNOWING about such sharing and not reporting it also constitutes academic dishonesty especially if close review of the evidence reveals sufficient evidence that implicates all individuals responsible.
- 3) Please remember that there is no statute of limitations on academic dishonesty, so if it turns out after grades are reported that there was cheating or knowledge of cheating that was unreported, grades can be changed after the fact.

Plagiarism: "Plagiarism is presenting another person's work as one's own. Plagiarism includes any paraphrasing or summarizing of the works of another person without acknowledgment, including the submitting of another student's work as one's own."

- 1) The first incident of plagiarism or unauthorized collaboration will result in the receipt of a failing grade (zero points) on the assignment.
- 2) Any subsequent incidents will result in the receipt of a failing course grade.

GSU Policy Prohibiting Students from Posting Instructor-Generated Materials on External Sites

The selling, sharing, publishing, presenting, or distributing of instructor-prepared course lecture notes, videos, audio recordings, or any other instructor-produced materials from any course for any commercial purpose is strictly prohibited unless explicit written permission is granted in advance by the course instructor. This includes posting any materials on websites such as Chegg, Course Hero, OneClass, Stuvia, StuDocu and other similar sites. Unauthorized sale or commercial distribution of such material is a violation of the instructor's intellectual property and the privacy rights of students attending the class, and is prohibited. This policy was approved by the GSU Faculty Senate on August 21, 2020.

Other Policies

Students Requiring Testing Accommodations

Students who wish to request testing accommodations may do so by registering with the [Access & Accommodations Center \(AACE\)](#). Students may only be accommodated upon issuance by AACE of a signed Accommodation Plan and are responsible for providing a copy of that plan to instructors of all classes in which an accommodation is sought.

FERPA

In keeping with USG and university policy, this course website will make every effort to maintain the privacy and accuracy of your personal information. Specifically, unless otherwise noted, it will not actively share personal information gathered from the site with anyone except university employees whose responsibilities require access to said

records. However, some information collected from the site may be subject to the Georgia Open Records Act. This means that while we do not actively share information, in some cases we may be compelled by law to release information gathered from the site. Also, the site will be managed in compliance with the Family Educational Rights and Privacy Act (FERPA), which prohibits the release of education records without student permission.

Basic Needs Statement

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide resources that we may possess. The [Embark program at GSU](#) provides resources for students facing homelessness and [Panther's Pantry](#) provides resources for students facing food insecurity.

Diversity, Inclusivity, and Respect Syllabus Statement

Students in this class are encouraged to speak up and participate during class meetings and online class discussions. The students in our class represent a diversity of individual beliefs, backgrounds, and experiences, and therefore, every member of this class must show respect for every other member of this class.