

Chemical Principles I Laboratory 50:160:125 Syllabus

Fall 2024

Course Description

The Chemical Principles I Laboratory (50:160:125) is a 1 credit course that is a co-requisite with Chemical Principles I Lecture (50:160:115). The math pre-requisite/co-requisite for this course is enrollment and successful completion of pre-calculus (50:640:115) or a higher-level math. Successful completion of both the first lecture and lab with a grade of “D” or better is the pre-requisite for the second semester lab. These chemistry courses are math based, and a strong mathematics foundation is needed for success in these courses. This class is designed to illustrate the principles and complement the topics discussed in Chemical Principles Lecture. This class and the grade you earn is independent of the Chemical Principles Lecture course and grade.

Learning Goals and Learning Objectives

Chemistry is an experimental science; this includes but is not limited to, careful observations, proper laboratory techniques, use of instrumentation, analysis of data, and formation of a conclusion. Observational skills, as well as the analysis of data and formation of a conclusion, are vital techniques in this course, as well as in the overarching science field. Each week of this course presents a new experiment designed to expose the student to a new topic or technique. Students will perform the experiment and analyze their obtained data. An introductory discussion includes defined objectives for both the theory and the necessary laboratory skills that would be required when performing the experiment. Students will develop a set of skills that include but are not limited to problem-solving, chemical literature and information management, oral and written communication, ethics: responsibility as a chemist to the world at large and to classmates, and laboratory and chemical safety. The development of these skills will involve careful observations, good laboratory techniques through observation, analysis of data, and formation of an in-depth conclusion.

As a result of successfully passing this course, a student should be able to:

1. Report measurements in an appropriate manner (i.e., to the correct uncertainties) using scientific notation whenever necessary and determine the measurement uncertainty of any given measurement tool (e.g., a ruler, graduated cylinder, buret).
2. Deduce the *minimum uncertainty* (i.e., the estimated digit) associated with any provided measurement using the significant figure convention and carry out calculations involving measurements (including unit conversions) using dimensional analysis and relevant significant figure rules.
3. Name and describe the four principles of laboratory chemical safety, i.e. RAMP, in their own words and identify (i.e., find and state) the chemical hazards associated with any chemical, e.g. in an SDS.
4. Create properly labeled (e.g., axis labels and legends) scatter graphs (with or without trendlines) for sets of data from spreadsheets and interpret provided graphs and their associated trendlines (e.g., identify the slope and intercept).
5. Convert mass measurements to number of moles of a substance, perform density calculations and utilize the dilution formula.
6. Write double displacement reactions for ionic compounds, conduct an acid-base titration (together with its associated calculations), carry out basic calorimetry experiments (together with its associated calculations), and study the emission spectrum of hydrogen (together with its associated calculations).
7. Identify and know how to properly utilize the following lab equipment and glassware: a graduated cylinder, a pipet, a buret, volumetric flask, vacuum filtration setup, spectrophotometer.
8. Conduct experiments individually or with a group of fellow course participants.

Required Course Materials

- Safety gear:
 - Cloth, long-sleeved lab coat (PROVIDED TO YOU)
 - Safety goggles (PROVIDED TO YOU)
- Printed procedure and data sheet for each experiment (must have it at the start of class)
- Notebook to record in-person observations and data
- Canvas account
- Basic scientific (non-graphing) calculator
- Computer access and internet connection
- Microsoft office programs for reports

One lab coat and pair of goggles will be provided for the duration of your chemistry career (chem principles lab II, organic chem lab, etc.) Be sure to keep your gear safe and write your name in it during the first day of class.

Class Format

This course has several different assignment types, including prelabs, exams, data analysis, and the formation of an in-depth conclusion. Deadlines are strictly enforced, and points are lost each day assignments are submitted late according to the late assignment guidelines section. There are two parts to this course: a recitation period and lab period. The recitation period is a lecture that introduces the theory, safety, and practical steps of the day's experiment. The lab period is when the experiments are performed using the newly learned techniques and safety guidelines.

Attendance

Exams as well as recitation and lab attendance cannot be made up. If you miss an exam or recitation/lab, you will receive no credit for that assignment. Extenuating circumstances may occur, but proper documentation will be required for these instances. As this is a hands-on laboratory course, weekly participation is required. Exceptions will be made on a case-by-case basis with your lab instructor, but proper documentation will be required (contact as soon as possible if you need to miss a lab due to illness or other extenuating circumstances). Missing more than three labs during the semester will result in an automatic grade of F for the lab course.

Communication guidelines

Please feel free to contact your instructor throughout the semester with any questions or concerns you have. General course questions, specific assignment questions, or confusion, as well as concerns you may have, are all welcome.

Email

When contacting your instructor, please include your full name. When you send your email, you can expect a response based on the following guidelines:

- Monday-Friday: within 24 hours (between 10:00am EST and 6:00pm EST, will likely be sooner).
- Weekend emails: within ~48 hours.
- Emails received between 8:00pm EST and 7:00am EST will not be answered until the next day.

Office hours

Office hours will be during designated times (provided by your instructor) or by appointment, which require 48-hour notice. Please email in advance with the specific reason you would like to meet if asking to schedule an appointment. Office hours may be subject to change depending on your instructor's availability. Each instructor will provide you with information about when and where office hours will be held.

What you can expect from your instructor in this course

- Communications to the entire class will come via Announcements in Canvas or Canvas emails. This will be a way to send out reminders, clarifications, or to announce when an assignment or video has been uploaded if not previously discussed. To ensure you receive these announcements/emails, please make sure your Canvas Notifications are set to alert you to new announcements immediately.
- Individual emails will be sent to your scarletmail email account. Please be sure to check this email daily.
- Provide feedback on all submitted prelabs, reports, and exams promptly to allow you to improve throughout the course.
 - To view feedback: click on the assignment of your choosing and then click "view feedback".
- Respond to emails based on the above guidelines.

Assessment and Grading Scheme

| Grade Percentage | Letter Grade |
|------------------|--------------|
| 100-90.00 | A |
| 89.99-85.00 | B+ |
| 84.99-80.00 | B |
| 79.99-75.00 | C+ |
| 74.99-70.00 | C |
| 69.99-60.00 | D |
| 59.99-0 | F |

| Activity Type | Percentage of Grade |
|-------------------------------------|---------------------|
| Recitation Attendance/Participation | 15% |
| Prelab Questions | 30% |
| Reports | 35% |
| Exams | 20% |

Late assignment guidelines

If you miss a deadline for an assignment, please submit to the appropriate assignment tab on Canvas as soon as possible. Prelabs and reports lose points according to the late grading scheme below:

- Immediately following deadline time to 7 days late: 5% of points deducted **per day**
- 8-14 days late: 50% of points available
- 15-21 days late: 25% of points available
- After 21 days: 0% of points available

Assignment Descriptions and Expectations

Recitation Attendance/Participation

You are expected to attend recitation each week during the scheduled timeframe. If you are more than 5 minutes late, you will lose 40% of participation credit for that day and not be permitted to perform the experiment for safety reasons. Instead, you will observe during your lab period and lose 25% of the credit on your lab report. This recitation period is used to discuss the background of the experiment you will be studying that day. Equations, math, and pertinent information will be covered. You are also expected to participate in the laboratory by performing the designated experiment.

Prelabs

Students will complete a prelab assignment before coming to recitation. The prelab will ensure students understand the background information related to each particular experiment and are able to connect it to what they will be performing in the lab. The prelab can include basic questions as well as a purpose statement. **If the entire prelab assignment is not completed prior to lab, students will not be permitted to perform the experiment. Instead, students will observe, and 25% of the credit on the report will be lost.** This is for safety reasons since this assignment introduces the hazards of the chemicals used. You will access the Modules tab and choose the appropriate lab to submit your document. All assignments must be in PDF format and only one file must be submitted. Resubmissions after the assignment deadline are not permitted.

Reports

Students will complete a report after performing the experiment. The report will ensure students understand the details related to each experiment. **This assignment is made up of both the data sheets and postlab questions, as well as a formal conclusion. Prior to recitation (start of class), the procedure and data sheets must be printed. Instructors will initial the printed sheets prior to leaving the recitation room. Printing during class is not permitted, and credit will be lost.** You will access the Modules tab and choose the appropriate lab to submit your document. All assignments must be in PDF format, and only one file must be submitted. Resubmissions after the assignment deadline are not permitted.

Exams

Two exams will be given containing information from specific experiments performed and studied throughout the semester. Test questions can be of the following types: matching, fill in the blank, calculations, equations, and short answer.

In-Person Experiments

When in-person, contact lenses may not be worn. Glasses must be worn in their place. No open-toed shoes, crocs, shorts, tank tops, etc. may be worn in the lab. Pants and close-toed shoes must be worn in addition to goggles, gloves, and lab coats at all times. If you are asked three times to put goggles or a different piece of personal protective equipment back on, you will be asked to leave the lab. Gloves must be removed before leaving the lab, and you also must wash your hands. Cell phones and headphones of any kind are strictly prohibited in the lab.

Academic Integrity

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Community Standards. Academic dishonesty includes (but is not limited to):

- Cheating on exams, quizzes, assignments, etc. (Example: copying work from students or online/unsolicited sources)
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication
- Using another person's ideas or words without attribution
- Re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work

If in doubt, please consult the instructor. Please review the Academic Integrity Policy at <https://deanofstudents.camden.rutgers.edu/sites/deanofstudents/files/Academic%20Integrity%20Policy.pdf>.

Medical Conditions

- Should you have any medical condition that could endanger yourself or classmates during the lab period, it is important that you notify the instructor immediately and confidentially.
- If you are pregnant or become pregnant, please speak with your instructor immediately.
- If you have a service dog, immediately contact your instructor.

Students with Disabilities

Students with disabilities are welcomed into all of the University's educational programs. If you have any concerns regarding your participation in a class for any reason, it is wise to know the services and accommodations that are available through the University. See the links below.

- <https://success.camden.rutgers.edu/disability-services>
- <https://webapps.rutgers.edu/student-ods/forms/registration>
- <https://ods.rutgers.edu/students/documentation-guidelines>

If you obtain a Letter of Accommodations from the Office of Disability, it is the student's responsibility to provide a copy of that Letter to the lab instructor within the first two weeks of the semester, if possible.

Serious Emergencies and Absences

If a serious emergency or problem (hospitalization, serious automobile accident, death of a family member, COVID-19 related, etc.) should occur during the course that will cause you to be absent from the class, please contact your instructor directly to report your absence. In certain instances, contacting the Dean of Students Office by calling 856-225-6050 or emailing deanofstudents@camden.rutgers.edu will be necessary. Documentation will be required for failing to complete the assignments or come to class on time.

Campus Resources

For a full list of resources on campus available to students, navigate to the sidebar of this canvas site and click on the tab labeled "RUC Student Resources", and click open link in new tab.

Schedule of Experiments: Fall 2024

| Week | Dates | Experiment | Exam/Quiz |
|------|--------------|---|--------------------|
| N/A | Sep 3-6 | NO LABS – DO NOT REPORT TO CLASS | - |
| 1 | Sep 9-13 | Check In/Safety/Syllabus | - |
| 2 | Sep 16-20 | Measurements/Significant Figures | - |
| 3 | Sep 23-27 | Graphical Analysis/Data Analysis, Math Review | - |
| 4 | Sep 30-Oct 4 | Dimensional Analysis | - |
| 5 | Oct 7-11 | Solubility and Density | - |
| 6 | Oct 14-18 | Dilutions | Exam 1 (Labs 1-5) |
| 7 | Oct 21-25 | Reactions in Aqueous Solutions | - |
| 8 | Oct 28-Nov 1 | Empirical Formula of a Compound | - |
| 9 | Nov 4-8 | Titrations of Acids and Bases | - |
| 10 | Nov 11-15 | Colorimetric Determination of Iron | - |
| 11 | Nov 18-22 | Enthalpy Changes in Chemical Reactions, Check Out | - |
| 12 | Nov 25-29 | NO LABS – Thanksgiving Recess | - |
| 13 | Dec 2-6 | Atomic Spectra and Flame Test | Exam 2 (Labs 6-12) |

Assignment Deadlines

Deadlines will be posted for each assignment in Canvas. However, the general guidelines for submitting assignments are as follows:

- Prelabs are due the day the lab will be discussed **before** your scheduled recitation time.
- Reports are due one week from when performed, **before** your scheduled recitation time.

Contact Information

| Instructor Name | Email | Section Number |
|-----------------|--|----------------|
| Mr. Helmbold | wjh96@camden.rutgers.edu | 01 |
| Ms. Blessing | bvb9@camden.rutgers.edu | 02, 04 |
| Dr. Winchell | kjwinchell@rutgers.edu | 03 |
| Mr. Dave | asim.dave@rutgers.edu | 05, 06 |
| Ms. Imthiyas | rahmah.imthiyas@rutgers.edu | 07 |

Fill In/Sign and Submit to Canvas

I have read and understand **ALL** of the requirements for this lab course, including those in the syllabus. Failure to comply with them will result in a loss of points and ultimately a lower grade.

Date: _____

Course number & section: 50:160:125:_____

Student's Signature: _____

Printed Name: _____