

CHEM 152L COURSE SYLLABUS

CRN 2423, Section 09, Thursday 8:00 am lab in SCST 332

Contact Information

Instructor: Dr. Jeremy Kua Office: SCST 381 Phone: x7970 Email: jkua@sandiego.edu
Website: <http://home.sandiego.edu/~jkua>

Office Hours

Tue 2:30–4:30 pm ; Wed 1-2 pm ; Thu 1:30-3pm ; Fri 10:30-11:30am

See my weekly timetable on my website for more details as to when you can find me if you cannot make it during scheduled office hours. (You can also e-mail me to make an appointment.)

Be Prepared

The key to success in this course is advance preparation. Before you walk in the door for the experiment, you want to be able to visualize everything you'll be doing in the lab that day, know the purpose for collecting each piece of data, and be able to do all of the calculations in the post-experiment. If you do this, you will be in control of your experiment, which will make your lab experience satisfying and fun instead of intimidating and stressful. (You should do this in all lab classes you take, not just this one – this is a good skill to develop now before you move on to upper-division lab courses.)

Pre-lab assignments

Your pre-lab assignments are due by Wednesday at 8am the preceding day (i.e. a full 24 hours before your lab on Thursday morning). Of course you may submit pre-lab assignments early if you wish. Please slide your work under my office door if it is closed. Graded pre-labs will be available in a file box located outside my office door for pick up by noon that same Wednesday. Please pick up and review your graded prelab BEFORE the lab experiment – this should help you on quizzes and notebook work.

Time Management

Plan to spend 1-2 hours outside of class preparing for the upcoming experiment. Be sure to work lab preparation time into your weekly schedule so that you are able to come by my office before it is due in case you have a questions on the pre-lab assignment, the experiment, or post-experiment calculations. It is your responsibility to be proactive.

Grades

Course grades will be assigned based on this scale:

A = 88 – 100% B = 75 – 87% C = 60 – 74% D = 45 – 59%

Plus and minus grades will be assigned to be $\pm 2\%$ within each category. See more information in Grade Details on page 3.

Notes

- ❖ Arrive to class on time – no make-up quizzes.
- ❖ A maximum of 50% credit will be given to any pre-lab assignment or notebook work submitted after the deadline, but before the graded work is available to be picked up (either in class or in the file box outside my office). After that, the late work will not receive any credit.

Course Design

Chemistry 152L is the second semester of a two-semester sequence which is designed to introduce you to the fundamental concepts, techniques, and methods of experimental chemistry. This is accomplished through a series of experiments that build upon each other. Many of the theoretical concepts and basic mathematical skills upon which the experiments depend are covered in Chemistry 152, so previous or concurrent registration in that course is required of students in 152L. Chemistry 152L builds upon the foundation we laid in Chemistry 151L, so successful completion of Chemistry 151L is a prerequisite for this course. The course is designed as a series of modules, and each module emphasizes a main theme that we believe a student should learn in a first-year chemistry course:

- Module 1 – Synthesis and Analysis
- Module 2 – Experimental Design
- Module 3 – Qualitative Analysis

Each module contains a specific set of goals. The first weeks of a given module are designed to teach you the techniques and concepts needed in order to reach the module's goals. The last week of a given module consists of a laboratory practical, where you will demonstrate your understanding of the laboratory concepts and techniques for that module.

Course Goals

This course will give you experience with how a chemist approaches a given chemical question, so where Chem 151L can be describe as a “fundamentals and techniques” course, Chem 152L is more of an “approach” course. Your background in Chem 151L will come in handy because you will use techniques from that course as tools to answer complex chemical questions. In this course you will learn how to:

1. Maintain a safe work environment by following general laboratory protocol (applied to more corrosive/toxic materials than were used in Chem 151L): proper handling and disposal of hazardous chemicals; maintaining a safe work environment; what to do in case of a lab emergency
2. Assess the factors that need to be considered when designing an experiment and use them to:
 - a. Understand why we performed the experiment the way we did (Module 1)
 - b. Design and carry out procedures of our own (Modules 2 and 3)
3. Perform simple tests to either characterize an unknown or to determine its identity
4. Organize a wide array of data for a series of unknowns using a qualitative analysis scheme
5. Use observations to guide you through your experiment
6. Link your observations to written chemical reactions taking place.
7. Perform three new separation techniques: gravity filtration, vacuum filtration, and decantation
8. Further develop/refine laboratory notebook writing skills

Learning Outcomes for Chem 152L

Upon completion of this course, you should be able to:

- 1) *Design a simple experiment that can answer a given chemical question.*
Determine what needs to be done and in what order, determine what types of glassware should be used in the experiment, assess the major sources of error and how to modify procedure to eliminate these errors if possible.
- 2) *Qualitatively analyze a given chemical or physical process.*
Observe a chemical and/or the changes that take place in a chemical reaction, perform a flame test or a precipitate test, test for acidity/basicity, identify an unknown from qualitative tests.
- 3) *Quantitatively analyze a chemical or chemical process.*
Generate and interpret a standard curve, interpret titration results, calculate percent yield for a synthesis, write a balanced chemical equation to describe an observed chemical change.

Grade Details

The module point totals with point values for the corresponding practicals in parentheses are as follows: Modules 1 and 2 will be 150 points each (practicals 50 points each) and Module 3 will be 125 points (practical 75 points). The “non-practical” point allotments within a given module will be devoted to notebook writing, quizzes, and class participation.

Please note that it is a violation of the Academic Integrity Policy to possess and otherwise use course materials (i.e. lab reports, problem sets, exams) from previous semesters of Chem 152L.

Safety Training

All students must attend the safety training session prior to beginning work in the lab. Any student who adds the class after the scheduled section has completed safety training must attend the mandatory make-up safety training session on Tuesday, February 7th, 2012, at 12:15 – 1:15 pm in SCST 349A.

Attendance Policy

Attendance at your regularly scheduled lab section is **mandatory**. Labs will begin promptly at 8:00 A.M., 1:25 P.M. and 2:30 P.M. The only reasons for missing a lab that could allow admission to a different section are:

- 1) Serious illness with proper documentation (i.e. doctor’s note) or
- 2) Required attendance at an official University event.

If you do have an excused absence, please see the “Make-Up Labs Protocol” instructions on the course website if you need to make up a lab experiment. Unexcused absences cannot be made up. If you miss more than one lab in the semester, you will fail the course.

Safety Policy

Your safety and that of your classmates is of paramount importance during laboratory. Safety regulations must always be observed as it only takes one accident to cause a serious permanent injury. Be sure to thoroughly review the department’s safety regulations.

The #1 safety concern in any lab is eye protection. For this reason, **safety spectacles must be worn at all times in the laboratory when anyone is doing lab work**. If you need to remove your spectacles during an experiment you will need to stop your lab work, notify your instructor, and excuse yourself from the room before removing the spectacles. Most lab-related eye injuries result from a spill that was generated **not** by the injured person, but by someone else in the nearby vicinity, so it is imperative that you keep your eyes covered when in the lab. Bring spectacles with you to the first lab experiment and store them in your locker for the semester. You will be asked to leave the lab and will receive a grade of zero for the experiment if you repeatedly violate the eye-protection policy.

Another important safety concern is proper laboratory attire. You will need to wear a lab coat and closed-toed shoes during each experiment, and be sure to secure long hair back.

Lab Notebook Policy

Since the lab notebook is an integral part of the experiment, you must bring your lab notebook to all lab meetings and do all work directly in the notebook. While discussion and exchange of ideas is encouraged, your lab write-up must be done in your own words.

All experimental procedures must be written in the lab notebook prior to actually performing the experiment. *Note: you may not bring printouts of the lab manual to class – all procedure information MUST be in your notebook.*

Please see the Laboratory Notebook handout for detailed guidelines on keeping a laboratory notebook. *Your instructor may penalize you for any violations of the above-mentioned policies.*

Laboratory Practicals

Guidelines for laboratory practicals:

1. The laboratory practicals for Chem 152L are open-notebook.
2. You must prepare for and work independently on all practicals.
3. You may ask questions about any concept, calculation, or technique for any experiment within the module EXCEPT the practical.
4. It is a matter of academic integrity that no student take notes or discuss the practical with anyone until all lab sections have completed the laboratory practical.

Equipment List

Here is a list of equipment and where each item can be found: (similar to Chem151L)

1. Lab Manual - USD Chemistry website:
<http://www.sandiego.edu/cas/chemistry/labs/genchemlab/main.html>
(Login and password are the same as in Chem151L or you can come by my office and ask me.)
2. Laboratory Notebook (ISBN: 1-930882-74-2 or 1-930882-00-9) – USD Bookstore
3. Lab Coat – USD Bookstore
4. Calculator
5. Safety Spectacles – Chem Club
6. Molecular Model Set – Chem Club

Breakage

You will be financially responsible for any cumulative glassware breakages/losses totaling over \$10.

Chem 152L Spring 2012 Calendar

	Mon	Tues	Wed	Thurs	Fri
	1/23	1/24	1/25	1/26	1/27
Locker Check-In and Orientation 1.1 – Nickel Salt Synthesis	1/30	1/31	2/1	2/2	2/3
1.2 – Nickel Salt Analysis: ethylenediamine content	2/6 *add deadline	2/7	2/8	2/9	2/10
1.3 – Nickel Salt Analysis: Nickel (II) & sulfate content	2/13	2/14	2/15	2/16	2/17
1.4 – Copper Cycle	2/20	2/21	2/22	2/23	2/24
1.5 - Practical: Alum Synthesis	2/27	2/28	2/29	3/1	3/2
Spring Break No classes	3/5	3/6	3/7	3/8	3/9
1.6 – Molecular Modeling	3/12	3/13	3/14	3/15	3/16
2.1 - Experimental Design: Kinetics of Bleach & Blue Dye	3/19	3/20	3/21	3/22	3/23
2.2 - Experimental Design: Kinetics of Bleach & Blue Dye	3/26	3/27	3/28	3/29	3/30
2.3 - Experimental Design: Kinetics of Bleach & Blue Dye MON AND TUES ONLY	4/2	4/3	4/4	4/5 EASTER BREAK	4/6 EASTER BREAK
2.3 - Experimental Design: Kinetics of Bleach & Blue Dye WED AND THURS ONLY	4/9 EASTER BREAK	4/10	4/11	4/12	4/13
2.4 – Practical – Rate Law	4/16	4/17	4/18	4/19	4/20
3.1 – Le Chatelier’s Principle	4/23	4/24	4/25	4/26	4/27
3.2 – QA of Household Chemicals	4/30	5/1	5/2	5/3	5/4
3.3 – QA Practical & Check-out	5/7	5/8	5/9	5/10	5/11
	5/14 LAST DAY				

University of San Diego
Department of Chemistry & Biochemistry
Laboratory Safety Regulations – copy for your records

These regulations apply to all USD chemistry teaching, research, and instrument laboratories.

LAB ATTIRE

1. Wear eye protection* over your eyes at all times when working in the lab.
2. Wear only protective, closed-toed shoes with low heels. Sandals and high heels are not permitted.
3. Tie back long hair and remove neckties, scarves, and dangly necklaces.
4. Wear non-synthetic clothing that has close-fitting sleeves.
5. A laboratory coat may be required.
 - Glasses are not considered adequate eye protection. Contact lenses are not recommended because irritating vapors can get trapped in them, they may hinder washing the chemical from the eye, and certain organic solvents can fuse them to the cornea.

CONDUCT IN THE LAB

1. **DO NOT WORK ALONE.** In the teaching laboratories the instructor must be present. In the research labs the supervising professor need not be present but at least two students must work together. The research students must be trained for lab safety and hazardous communications.
2. Know where the safety equipment is located in the lab.
3. Maintain a serious attitude. Horseplay or other careless acts are prohibited.
4. Unauthorized experiments are absolutely forbidden.
5. Never remove chemicals from the facility.
6. Immediately clean up chemical spills. If the spill is large, notify instructor so that (s)he can clean it up.
7. Clean spilled chemicals off balances.
8. Put all chemical wastes in the appropriate waste bottles in the hoods. **Never flush wastes down the drains!**
9. No smoking, drinking or eating is permitted at any time.
10. Read the label on a reagent bottle twice before removing any chemicals.
11. Avoid direct contact w/ chemicals by using appropriate personal protective equipment: use gloves when working with toxic chemicals; use the fume hood when working with volatile chemicals.
12. Be aware of your neighbor's activities; you may be a victim of their mistakes.
13. Always thoroughly wash your hands before leaving the laboratory.
14. Keep aisles clear - avoid creating obstructions by storing personal belongings in an out-of-the-way place.

IN CASE OF AN ACCIDENT OR INJURY:

NOTIFY YOUR INSTRUCTOR OR SUPERVISOR, EVEN IF THE MISHAP IS A MINOR ONE.

- If your skin comes in contact with a chemical, wash skin immediately with large amounts of water. As you're washing, remove all contaminated clothing. If the spill was small, wash off the chemical at the nearest sink. If the spill was large, you will need to use the safety shower.
- If a chemical gets in your eyes, immediately wash them at the eyewash station. Most eye wash instructions call for a 10-15 minutes flushing of the eyes.
- If your clothing catches fire: "Stop, Drop & Roll".

If you have a medical condition that may be affected by the activities in this lab, it is your responsibility to notify the instructor. Examples include pregnancy, seizures, asthma, and severe allergies. A physician release may be requested.

Wear contact lenses at your own risk.