

Chemistry 113A Organic Chemistry Laboratory (Sec 3)

Fall 2022

Contact Information

Instructor:	Chad Miller, MS
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Office Hours:	Tues & Thurs 9:00am to 10:00am
Class Days/Times/Room:	Tues & Thurs 10:30am to 1:20pm in Science 154
Prerequisites:	CHEM 112A (<u>completed</u> with a grade of "C" or better; "C-" not accepted); Chem 112A may not be taken concurrently with Chem 113A.

Faculty Web Page and MYSJSU Messaging

Unless otherwise announced, this section of Chem 113A will be held in Science 154. As this is a laboratory course, you must be physically present for labs during all scheduled sessions.

Emails related to this course will be sent to the email address on your mySJSU account; check it regularly for messages.

A significant amount of material for the course will be posted on the Canvas site for this course.

COVID Policies

COVID-19 and Monkeypox are still active in our community and it is our collective responsibility to deal with these serious health issues. See the section below regarding current COVID policies for SJSU and the College of Science.

Course Description

Chem 113A introduces many of the basic techniques for synthesis, isolation, purification and identification of organic compounds. The emphasis is on practical skills in the laboratory and in analysis of data. Sufficient theoretical background will be developed to allow the student to understand the design of experiments and to modify established procedures. The course will also provide practice in the formal writing and reporting of

experimental procedures and findings. See the Calendar at the end of this document for important dates.

Required Texts/Readings

GREENSHEET AND CALENDAR

This Greensheet and Calendar will be posted on Canvas for this section, and also on the Chemistry Department website (<http://www.sjsu.edu/chemistry/>).

REQUIRED TEXTBOOK AND OTHER ITEMS: (IF YOU ARE A CHEMISTRY/BIOCHEMISTRY MAJOR or MINOR, READ THE COMMENT ABOUT THE PAVIA TEXTBOOK)

- 1) Pavia, D. L., Lampman, G. M., Kriz, G. S., Vyvyan, J. R. *Introduction to Spectroscopy*, 5th ed., **Cengage**. (read the next 2 sections carefully before you purchase Pavia)

The SJSU Bookstore sells a custom truncated version of Pavia intended for non-ChemBiochem majors. It is missing several important chapters that will be needed for Chem 113B/114, so if you plan to take these courses, the custom version is NOT appropriate for you

CHEMISTRY/BIOCHEMISTRY MAJORS or MINORS WHO PLAN TO TAKE CHEM 113B and/or 114 IN THE FUTURE SHOULD OBTAIN THE FULL EDITION OF PAVIA. The SJSU Bookstore does not carry this edition, but it can be obtained from Amazon or other book sellers. The shortened edition mentioned above does not have important chapters you need for later courses. DO NOT obtain the electronic (eBook) version for this class – you may use a paper copy during quizzes and exams, but may NOT use an electronic version of Pavia or any other source of information.

Make sure you have the 5th edition of Pavia; older editions contain significant differences.

Canvas will be used extensively in this course. Many important documents will be posted on Canvas, and you will be required to submit reports and assignments electronically to Canvas (as well as printed on paper). Therefore, you are required to have a device (such as a computer, pad, smartphone) that allows you to access the web and use this platform. You must also have access to an internet service that provides a reliable connection. It is expected that quizzes and exams will be given on paper during lab time, but it is possible some may be given online. Details will be provided by your instructor.

- 2) ***A Lab Coat will be required to work in this lab course. This will be provided for you to use during the semester. It must be returned at the end of the semester.***
- 3) **A scientific Laboratory Notebook with numbered and “carbonless” duplicate pages is required. You will be making entries as you perform your experiments and enter your analysis and conclusions. The duplicate pages will be turned in with every lab report.
Here is one version available from Amazon:**

https://www.amazon.com/BARBAKAM-Notebook-Carbonless-Spiral-Perforated/dp/0978534425/ref=sr_1_5?crid=1RK5CII537JST&keywords=scientific+notebook+duplicate+numbered&qid=1642894219&sprefix=scientific+notebook+guplicate+numbered%2Caps%2C198&sr=8-5

(The SJSU Bookstore does not sell a notebook which is acceptable for Chem 113A)

Other Recommended Readings

- McMurry, John, *Organic Chemistry* (any recent edition), or an organic chemistry textbook from a one-year Ochem lecture course.
- *The ACS Style Guide: Effective Communication of Scientific Information* 3rd ed.; Coghill, A. M., Garson, L. R., Eds.; American Chemical Society: Washington DC, 2006

Other equipment / material requirements

- Scientific laboratory notebook with duplicate numbered pages
- Basic calculator (one that cannot connect to the internet, bring to every quiz/exam)
- Pencils, rulers

Library Liaison

The Chemistry Library Liaison is Anne Marie Engelsen
Email: annemarie.engelsen@sjsu.edu

Course Prerequisites and Learning Objectives

Catalog Description *Fundamental techniques for the isolation, characterization and synthesis of organic compounds. Prerequisite: CHEM 112A (with a grade of "C" or better; "C-" not accepted). Misc/Lab: Lab 6 hours.*

You must have completed Chem 112A with a grade of "C" or better to enroll in Chem 113A. **If you are repeating Chem 112A, you may not take Chem 113A until you complete 112A with a grade of "C" or better – 112A and 113A may not be taken at the same time!** If you took an 112A-equivalent course at another institution, the instructor will ask for verification of your grade and information on the lab course you took.

The scheduled weekly time for Section 3 is Tues & Thurs 10:30am to 1:20pm in Science 154. The Calendar at the end of this Greensheet will tell you what will occur on each lab meeting. Depending on the pace of the class, it is possible that some activities may change to sooner or later dates.

Chem 113A will include six Experiments (A to F). You will prepare reports for each of these Experiments – four in written format (ABDE) and two in video format C&F). These reports must be submitted electronically to Canvas assignments and also printed on paper in the lab, along with duplicate copies of your notebook pages and data (e.g. GC, IR, NMR spectra) Information on preparing and submitting Lab Reports is found in Canvas Files.

See the Calendar for due dates of each report. At the start of the period when a report is due, you will also take a short lab quiz on Canvas which is based on the experiment (6 quizzes total). A midterm and Final Exam are also scheduled.

Course Goals and Learning Objectives - Chem 113A

- Students will be able to demonstrate their knowledge of departmental safety rules through their laboratory practice, including the ability to dispose of waste properly (Note this applies even though you will not be working in the lab)
- Students are expected to apply basic stoichiometric algorithms (such as calculating limiting reagents, theoretical yield and mole ratios) in the context of organic chemistry.
- Students will be expected to demonstrate a command of the rules for assigning significant figures in their work, specifically in calculations and laboratory measurements and calculations.
- Understand and be able to use the basic operations of an organic chemistry laboratory including gravity & vacuum filtration, liquid-liquid extraction, distillation, reflux, recrystallization, drying of solids and solutions, melting points and the theories behind these techniques.
- Know the significance of pKa values in experimental steps.
- Identify and assess the purity of organic compounds using analytical techniques including melting point, thin layer chromatography (TLC), IR (*v.i.¹*), NMR (*v.i.*), and gas chromatography (GC).
- Deduce organic structures using spectroscopic methods: especially infrared (IR) and nuclear magnetic resonance (NMR) spectroscopy.
 - determine molecular formulas from structures, molecular mass (using the Rule of 13), and other sources of information.
 - be able to deduce hydrogen deficiency index (HDI) from a molecular formula and use this in structure determination.

For NMR spectroscopy, students will be able to:

- understand the fundamental theory of 1-dimensional proton NMR analysis
- understand the concepts of equivalent and non-equivalent hydrogens.
- understand the effect of structure on chemical shift and coupling constants.
- demonstrate awareness of the regions of the NMR spectrum where various key protons are found.

¹ *Latin vide infra* (see [below](#))

- calculate chemical shifts for substituted alkanes and aromatics using tables.
- demonstrate how to utilize integrals for structure analysis
- construct splitting diagrams (“trees”) and be able to measure coupling constants from an NMR spectrum, or predict coupling constants and trees from a structure.
- recognize and know how to test for exchangeable hydrogens in a molecule.
- identify the peaks that correspond to the solvent and to the internal reference (TMS).
- deduce unknown structures and fully assign an NMR spectrum to the structure.

For IR Spectroscopy, students will be able to:

- explain the basic principles of IR spectroscopy.
 - identify and explain factors that influence the strength and frequency of an IR peak.
 - assign key peaks in an IR spectrum.
 - determine which peaks are most diagnostic in making an assignment of structure using IR.
 - record an IR spectrum.
 - deduce unknown structures and fully assign an IR spectrum to the structure.
- Students will be able to follow a detailed experimental procedure, and construct a flow diagram to illustrate it.
 - Students will be able to explain the theory behind the operations performed, including being able to explain deviations from the theoretically optimum results (which is the usual case), and suggest improvements to the procedures employed.
 - Students will be able to depict and explain detailed chemical mechanisms for all laboratory reactions employed in Chem 113A, and for related reactions.
 - Students are expected to keep contemporaneous notes – They will demonstrate the ability to maintain a proper lab notebook.
 - Students will be able to construct a lab report (written and by video) that includes an analysis of the data collected, and discussion of the outcomes and answers to open questions associated with the Experiment.

Program Learning Outcomes (PLO) – SJSU Department of Chemistry

I. Core Chemistry Ideas (Fundamentals)

PLO 1.1 - Students will be able to identify, formulate, and solve a range of chemistry problems (fundamental to complex) through application of mathematical, scientific, and chemical principles.

PLO 1.2 - Students will be able to recognize, relate, and/or apply chemistry terms and concepts to propose and solve interdisciplinary and multidisciplinary real world problems.

II. Experimentation/Lab Practice

PLO 2.1. Students will be able to develop an experiment to address a hypothesis using literature and execute the planned experiment using standard chemistry techniques.

PLO 2.2 Students will be able to acquire, record, and critically evaluate data through use of instrumentation and software, appropriate record keeping practices, figure preparation, and scrutiny of experimental results.

PLO 2.3 Students will be able to recognize and assess laboratory hazards, practice risk minimization, and conduct safe laboratory practices.

III. Community, Social, Societal Implications

PLO 3.1 Students will be able to explore, critique, and reflect on how chemistry relates to society, culture, and issues of equity and ethics that shape their scientific beliefs and identities.

PLO 3.2 Students will be able to identify as scientists within the scientific community through constructing peer reviews, engaging in collaborations, and participating in mentorship.

IV. Communication Skills

PLO 4.1 Students will be able to design and deliver engaging presentations on diverse chemistry topics in a professional manner and with clear, concise organization that demonstrates mastery of the topic.

PLO 4.2 Students will be able to integrate research findings into a concise original written report that either analyzes collected data and obtained results or reviews and reflects on published scientific work.

PLO 4.3 Students will be able to identify an audience and construct a message tailored to that audience and act as a science ambassador by conveying the importance of the research or topic of study.

PLO 4.4 Students will be able to prepare professional documents, such as résumés and cover letters, that accurately represent the students' skills and knowledge for graduate/professional school or potential future employers.

Tentative Course Calendar:

A Calendar showing the experiments, report due dates and lab quizzes appears at the end of this Greensheet. In addition, note the following EXAM dates:

Midterm Exam	Nov 1, 2022 (90min during lab session)
Final Exam	Dec. 13, 2022 (Tues) 9:45am to noon

The activities on each date on the Calendar are tentative and is subject to modification (however, the Midterm, Final Exam and due date for the last experiment will not change). Any changes will only be announced during a online lab meetings (no notice will be sent by email). It is your responsibility to keep aware of the Calendar, especially due dates of

reports, quizzes and exams. **You must be present on all quiz and exam dates - do not plan any travel or other absences on these dates.**

All exams and quizzes will be given in our lab room (Science 154), unless otherwise indicated. The exams and quizzes will only be available on the dates and times specified for your section on the Calendar. On the due dates, your Lab Reports will be submitted both in printed form in the lab on paper, and also be uploaded to Canvas Assignments. On dates that Reports are due, a short online quiz based on the lab will also be given.

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. **More details about student workload can be found in University Policy S12-3 at**

<http://www.sjsu.edu/senate/docs/S12-3.pdf>

Attendance Policy / Lab Makeup

Your attendance is **mandatory** for ALL Chemistry 113A lab meetings in the Science lab room. The semester Calendar is set to provide adequate time for students to complete all of the experiments. Keeping on time with the Calendar requires both your participation and preparation before each lab meeting – don't fall behind!

If you know you cannot attend ALL of the meetings of this lab section, DO NOT enroll in this section as the options for makeup labs will be very limited. Chem 113A is a practical lab course, and requires you to be physically present for every lab meeting. All of the 113A lab sections are at full capacity and cannot accommodate extra students. If you must miss a lab due to an emergency medical problem, contact me as soon as possible and I will attempt to work out an accommodation, but this is the only situation that will be considered. Missing labs due to any other reason, such as travel due to personal, school, or business, will not be considered.

University policy F69-24, "Students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because ACTIVE participation is frequently essential to insure maximum benefit for all members of the class. Attendance per se shall not be used as a criterion for grading."

Grading Policy

GRADING (see below for numerical breakdown and percentages)

Laboratory Reports: Six reports will be due for Chem 113A. Information on general report format and submission is provided in Canvas Files under Reports. Each report may require specific details - your instructor will provide guidelines on what is needed. Two reports (for Experiments C and F) will be given as video reports, and reports for A, B, D and E will be written reports.

On the due date of a report, prior to the start of your section, an electronic copy must be submitted to Canvas Assignments which will be analyzed by turnitin.com - an analysis of your report will be provided to me. If you have issues with accessing Canvas, let your instructor know in advance of the first due date. At the start of your lab section, a printed copy of your written report, duplicate notebook pages and data (e.g. GC, IR, NMR) must be turned in before the lab quiz.

Lab Quizzes: At the start of the sessions when reports are due (see the Calendar), a short Lab Quiz based on the Experiment will be given in class.

Midterm Exam: a midterm exam based on material covered to that point will be given in class (see Calendar).

Final Exam: a comprehensive Final Exam will involve all topics covered in Chem 113A (see Schedule).

Note that the final 113A grade is based on a *conglomerate* of the individual graded items. Thus, if you have a somewhat low grade on one item, you can make it up with a better grade of another item. The course grades are given on a "+/-" system.

All quizzes and exams are open to the printed version of the Pavia textbook **ONLY**- electronic versions (eBooks) are not allowed during quizzes and exams. You are **required to bring your OWN paper copy for the exams**. Sharing of books during tests is not allowed. Using any device which has access to the Web is prohibited during any 113A quiz or exam.

Grading Information:

The grades for this course will be assigned as "plus/minus." The points and percentages of each type of graded items is as follows:

6 laboratory reports (80pts ea)	480 points total ^a (48%)
6 laboratory quizzes (20pts ea)	120 points total ^b (12%)
Midterm	150 points (15%)
Final exam	<u>250 points (25%)</u>
Total possible for 113A	1000 points possible

The overall course grade will generally follow the following correlations:

A+ = 100-97%	A = 96-93%	A- = 92-90%
B+ = 89-87%	B = 86-83%	B- = 82-80%
C+ = 79-77%	C = 76-73%	C- = 72-70%
D+ = 69-67%	D = 66-63%	D- = 62-60%
F = <59% Unsatisfactory		

Late reports beyond a deadline are subject to a late penalty - medical absences with documentation will be considered. The report is considered fully "turned-in" when all required items are submitted. Late reports for Experiments will be accepted only up until the date graded reports are returned to the class (i.e. late reports will not be accepted once I return the graded reports to the rest of the class).

The report for Experiment F must be received by the due date given by your instructor. **No reports will be accepted after the last posted due date for your section!**

All experiment reports are **mandatory**: if no report is turned in for an Experiment, up to 10 points will be deducted from the total points accumulated for the semester.

In order to estimate your current grade in this course and progress towards your course grade, keep track of scores on Canvas Grades for all graded assignments (quizzes, lab reports, midterm) as the semester progresses. Add the points you obtained and divide by the total points scored up until that time to determine your % of points to that date. Compare the % to the table of grade ranges to estimate your current grade standing.

Bear in mind that the final course grade is based on multiple components so you have different opportunities to make up a low score. Especially towards the second half of the semester, monitor your accumulated points and %, because that will indicate to what extent you will need to obtain points to attain a desired course grade. A word of advice is that you should not rely on the last report and/or the final exam to make up for a low point total!

Scores for individual reports, quizzes and exams will be posted on Canvas Grades, but for security reasons, your 113A course grade cannot be posted there. You will see your Chem 113A grade posted on your mySJSU transcript when it is determined. Final course grades are not posted, sent by email, or given over the phone.

Use the 113A Calendar below to plan your time accordingly. Preparation for the lab will help you immensely to keep on schedule.

“A minimum aggregate GPA of 2.0 SJSU Studies (R, S, & V) shall be required of all students as a graduation requirement.” To see full text, review [University Policy S11-3](#) at

<http://www.sjsu.edu/senate/docs/S11-3.pdf>

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

LABORATORY SAFETY

Read everything below BEFORE the first class meeting – you will take a safety quiz on the first class and must pass it!

You are required to read and acknowledge that you have understood and will comply with the following documents related to chemical safety and COVID safety:

READ: CHEMICAL SAFETY RULES FOR TEACHING LABORATORIES:

https://www.sjsu.edu/chemistry/docs/Forms/Safety%20Sheet%20for%20Teaching%20Laboratories_02262020.pdf

CHEMISTRY SAFETY FILM (shown in-class)

STANDARD OPERATING PROCEDURES (SOPs) for chemicals used in Chem 113A. (see “Safety Information” in Canvas Files.)

COVID-19 & Monkeypox SAFETY INFORMATION & POLICIES

Required of ALL students attending classes/labs on the SJSU campus

Students registered for a College of Science (CoS) class with an in-person component should view the [CoS COVID-19 and Monkeypox Training](#) slides for updated CoS, SJSU, county, state and federal information and guidelines, and more information can be found on the [SJSU Health Advisories](#) website (banner on www.sjsu.edu). By working together to follow these safety practices, we can keep our college safer. Failure to follow safety practice(s) outlined in the training, the SJSU Health Advisories website, or instructions from instructors, TAs or CoS Safety Staff may result in dismissal from CoS buildings, facilities or field sites. Updates will be implemented as changes occur (and posted to the same links). Please review this training as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links).

As you are aware, the COVID-19 pandemic (and more recently, Monkeypox) have led to many restrictions on our daily lives. The rules you have become familiar with extend into working situations and conduct in a laboratory, but there are other lab-specific rules that you must comply with for your own safety and for everyone else in the lab. Your instructor will go into the full list of steps to follow in detail, but here is a summary:

- 1) Before your first in-class meeting, you must review the College of Science COVID-19 and Monkeypox training slides. You can see the slides in Canvas-Files-Chem 113A Safety Information. After reviewing these slides, go to your Canvas Quizzes and answer the one question where you will acknowledge that you have read and will comply with the rules for COVID-19 & Monkeypox safety. Everyone must submit a “TRUE” answer to this question to this acknowledgment in order to continue in Chem 113A.
- 2). Masks, as described in the Safety Training, must be worn at all times when in the Science Building– this is mandated by SJSU whenever inside all campus buildings. The current CDC recommendation is for a N95 or KN95 type mask; cloth masks are no longer considered safe for use to reduce transmission of the omicron variant. This policy is for everyone’s safety and will be strictly enforced. Masks must cover the nose and mouth completely - anyone who does not comply with this policy will be asked to leave the building and may be disenrolled from Chem 113A. If you forget to bring a mask to lab, basic masks (but not N95 or KN95) are available for you to use.
- 3) Wash your hands frequently: in the hallway of the Science Building are alcohol-based soap dispensers; soap for handwashing is available in the Science labs and the bathrooms, and alcohol disinfectant outside the bathrooms and near the Stockroom.
- 4) As described in the COVID-19 Safety Training, you should NOT come to class if you feel ill or if you come in close contact with someone who has an active case of COVID-19.

Get tested as soon as possible. If you test positive for COVID-19, inform your instructor immediately. He/she will send you a set of directions to follow.

Prior to the first in class meeting, you are required to review the SJSU Phase Adapt Plan and the College of Science COVID-19 & Monkeypox Safety documents. Then go to the Canvas Quizzes for you 113A section and answer "TRUE" to the one-question "quiz" for COVID training. This is required to continue in Chem 113A and will be recorded.

Additional Safety Rules for Chem 113A

Safety Rules will be discussed on the FIRST meeting of your lab in class. You must be present and take and pass the Safety Quiz given at this time.

Knowing how to work safely in an organic chemistry laboratory is paramount for Chem 113A, and for anyone working in a laboratory setting. For your safety and of your classmates, you will be required to understand and follow safety policies that are described below.

Before beginning any lab work, the following items must be completed:

- 1) Attend the Safety Lecture (first meeting in lab)
- 2) Read the Chemical Safety Rules for Chemistry Labs (go to this site – copy the URL if necessary):

https://www.sjsu.edu/chemistry/docs/Forms/Safety%20Sheet%20for%20Teaching%20Laboratories_02262020.pdf

- 3) View the Chemistry Safety film on YouTube (in class) and sign the viewing voucher
- 4) Read and learn the additional rules for organic labs below.
- 5). Your instructor will explain "Standard Operating Procedures" (SOPs) for handling certain chemicals, and have you sign a form that you understand safe handling of these chemicals (must be a "wet" signature on a form).
- 5) Take the Lab Safety Quiz on Canvas and obtain a score of 80% or better; retake the quiz if score is <80%.

All of the above conditions are required.

In addition to the points covered above, the following rules are emphasized in this lab:

1. ***AS SOON AS ONE PERSON BEGINS WORK IN THE LAB, YOU MUST ALWAYS WEAR SAFETY GOGGLES, EVEN IF YOU ARE NOT DOING ANY WORK YOURSELF!!!*** (over your eyes, not on your forehead!) If you see a fellow student not wearing eye protection, you are obligated to remind them to protect their eyes.
2. Be aware that we will be using some flammable solvents, do not have **any** flames when you (or someone else in the room) are handling these
3. Similarly, treat all acids, bases, and reagents as potential hazards. Avoid skin contact with all of these, and treat any contact immediately. If you have a spill, never leave it unattended - let the instructor know.

4. Dispose of all glassware in the special bins, not in the trash cans! This includes broken glass, as well as expendable items such as pipettes and melting point capillaries.

5. Some experiments require special safety precautions - these may be found in the protocols or given by the instructor. Always enter these into your procedure/flow scheme section in your notebook (this is another reason to read ahead and to be on time at the start of each lab)

6. You are absolutely required to follow any instructions provided by the instructor related to procedures and/or safety. Failure to do so will result in your grade or result in immediate disenrollment from this class (see statement below).

7. Everyone working in the lab is expected to conduct yourself in a professional manner; no horseplay or unsafe actions are allowed.

8. Gloves are required for many experiments. These are always available from the Stockroom for a cost. You may prefer to purchase a box of disposable gloves to use during the semester.

9. Minimize contact with all liquid and solid chemicals, and DO NOT intentionally breathe in any vapors. Where practical, do experimental work in the hoods.

10. Note in the safety rules, that legs and feet must be covered - no shorts, sandals or open toed footwear allowed. You will not be allowed to work in the lab. I suggest you bring a change of clothes on lab days.

11. The following PPE (Personal Protective Equipment) will be provided to you:

-lab coat (used only by you during the semester: returned at the end of the semester)

-safety goggles

-disposable gloves

-basic masks (not N95 or KN95 however; to be used only for times when you do not have a N95 or KN95 mask of your own)

12. If you are not sure, ask!!

Failure to comply with proper procedures and prescribed safety cautions shall subject the student to disciplinary action.

1) Any student who engages in unauthorized experimentation, or who seriously disregards safety, thereby endangering self or others shall be withdrawn immediately from the class with a grade of F.

2) Any student who shows persistent disregard for safety may have his/her grade lowered, and may risk being withdrawn with a final grade of F.

Special rules of safety and conduct apply when using the Bruker Fourier 300 NMR and the GC and other instruments. These will be provided by the instructor.

With preparation and organization, it is possible to complete all of your lab work during the scheduled lab period. For safety reasons, NO lab work will be permitted outside of the scheduled lab times. Any student found performing unauthorized lab work for 113A may be disenrolled from the class.

As mentioned previously, options for makeup labs are extremely limited – do not take this lab if you know you cannot attend all of the lab meetings. If you must miss a lab meeting due to an illness or emergency, contact me as soon as possible. I will try (but cannot guarantee) some kind of accommodation. Verification (e.g. a doctor's note) will be

required. However, if you miss more than one or two lab periods during the semester, it may be difficult to complete the course.

Additional Policies for Chem 113A:

Visitors: No visitors are allowed in the lab at any time. Access to Science 135, 139 & 154 are only for enrolled students who are specifically assigned to each room.

Cell Phones, music/video/game players: These may not be used in the lab. Unless you have an emergency, turn off cell phones and make your calls before or after class. **DO NOT make calls when an experiment is in progress!**

Computers & Electronic Devices: computers may be used during lab experiments, but this is not recommended since chemicals may spill on them and damage your device. During quizzes and exams, computers/tablets/cellphones/any web devices are NOT allowed.

While working in the lab, distractions must be kept to a minimum - this includes listening to music and watching videos. Headphones or earbuds may not be used - you must be able to hear instructions or emergency alarms.

Notebook Preparation for Experiments (“Prelabs”):

Some Experiments will require the preparation of a “PreLab” notebook before you can begin the Experiment. The Prelab is an outline of the planned Experiment and is intended to prepare you before you begin experimental work. Your instructor will inform you of which Experiments require a prelab and on how to format your notebook.

Equipment (for all in-lab sections)

A printed copy of current Stockroom policies will be provided to you when you check-in to a locker. These policies will be rigidly enforced so read them immediately - ask the Stockroom staff if you have any questions.

You will be assigned an individual locker of equipment for your use during this course. You will be checked into your locker during the first lab period by the instructor, and sign an acknowledgement that you have all of your equipment. ***Your check in day is the only day when missing or broken/chipped items will be replaced at no charge.*** After the first day, you are responsible for maintaining all of the contents of your drawer. If you lose or break any item, you will be assessed a replacement fee at the end of the semester, so be careful with your equipment! It is possible to complete this course with a relatively small bill for expendable items: it is also possible to end up with a >\$100 bill due to loss or breakage. At the end of each lab period, make sure you have collected all your locker items before leaving and lock your drawer!

When you check in, you will be given a coded check out pad from the storeroom. You may use this pad to check out additional equipment from the storeroom which may be required for a particular experiment. **Note that certain items checked out must be returned the same day to avoid a late fee.** Remember, the code on your pad is assigned ONLY to you, don't lose it, or someone else can check out items which will be charged to your account.

At the end of the semester, you must clean out your locker, replace all broken equipment or glassware, and have the instructor sign the check-out form. If this process is not completed fully, you may be charged a fee to clean and refurbish your locker. If you drop or do not complete Chem 113A, you must check out of your locker to avoid a \$50 or more check out fee. All checkouts must be done by the last lab day of your lab meeting (see

the Calendar); no checkouts will be done after this date. An exception is if you contact COVID-19 and cannot continue the lab. Contact your instructor as soon as possible.

Chemical Safety (CHEM 120S) – All Students

[CHEM 120S Chemical Safety Seminar](#) is a required course for all chemistry majors and minors. The [Safety Training](#) (not CHEM 120S) is a requirement/prerequisite for CHEM 180/298, if working in a wet/chemical research lab.

•Emergencies and Building Evacuations

If you hear a continuously sounding alarm, or are told to evacuate the building by an Emergency Coordinator, walk quickly to the nearest exit (out the lab door and go to the nearest exit of the Science Building). Take your personal belongings as you may not be allowed to return. Follow the instructions of the Emergency Coordinators. Be quiet so you can hear instructions. Once outside, move away from the building. Do not return to the building unless the Police or the Emergency Coordinator announces that this is permissible.

Additional University Policies – All Students (SJSU Policies)

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Make sure to review these university policies and resources.

The topics include the following:

[General Expectations, Rights and Responsibilities of the Student](#)

[Dropping and Adding](#)

[Consent for Recording of Class and Public Sharing of Instructor Material](#)

[Academic integrity](#)

[Campus Policy in Compliance with the American Disabilities Act](#)

[Student Technology Resources](#)

[SJSU Peer Connections](#)

[SJSU Writing Center](#)

[SJSU Counseling and Psychological Services](#)

Order of Laboratory Experiments

The general order of Experiments is shown below. Exact dates may be modified as the semester progresses. (yes, Exp C happens before Exp B!)

Experiment A: Extraction and Analysis of Natural Products from Plants

Experiment C: Identification of Unknown Compounds Using IR and NMR Spectroscopy*

Experiment B: Purification and Analytical Methods

B1. Distillation and Gas Chromatography of an Alcohol Mixture

B2. Recrystallization and Melting Points

Experiment D: Preparation of an Ester and Structure Identification by NMR Spectroscopy

Experiment E: Isolation and Analysis of Alkaloids from Cinchona Bark

Experiment F: Identification of an Unknown Organic Compound .

The Calendar below is subject to change. However, the midterm or final exam dates will not change.

August 2022

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
15	16	17	18	19	20
22	23 FIRST LAB Intro, Safety lecture & quiz, check-in; Exp A collect plants	24	25 Exp A cont.	26	27

September 2022

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Aug 29	Aug 30 Exp A cont.	Aug 31	1 Exp A cont.	2	3
5 LABOR DAY	6 Exp A finish	7	8 Exp C IR Spectroscopy 1	9	10
12	13 Exp C IR Spectroscopy 2 Exp A report due & quiz	14	15 Exp C NMR Spectroscopy 1	16	17
19	20 Exp C NMR Spectroscopy 2	21	22 Exp C In-Class Exercise; Prelab Exp B	23	24

26	27 Exp B Distillation	28	29 Exp B GC /recryst Exp C report due & quiz (video report)	30
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October 2022

Monday	Tuesday	Wednesday	Thursday	Friday
3	4 Exp B GC /recryst	5	6 Exp B GC /recryst	7
10	11 Exp B GC /recryst/MP	12	13 Exp D. ester reflux	14
17	18 Exp D ester workup Exp B due & quiz	19	20 Exp D ester	21
24	25 Exp D. ester	26	27 Exp D. ester prepare NMR, IR, structure discussion	28

November 2022

Monday	Tuesday	Wednesday	Thursday	Friday
Oct 31	1 MIDTERM Exp E Cinchona background	2	3 Exp E Prepare F NMRs & measure IR	4
7	8 Exp E Exp D report due & quiz	9	10 Exp E	11 Veteran's Day

14	15 Exp E	16	17 Exp E	18
21	22 Exp E	23 Non-Instructional Day	24 Thanks giving	25 Thanksgiving

December 2022

Monday	Tuesday	Wednesday	Thursday	Friday
Nov 28	Nov 29 Exp E	Nov 30	1 Review CHECK OUT <i>Exp E & F Reports</i> Due & Quiz (last lab)	2
5	6 Last Day Fall 22 (no 113A labs)	7 Study Day (no classes) Check your greensheet for the date & time of your Final!	8 First day of finals	9
12	13	14	15	16

**VERIFY THE DATE AND TIME OF YOUR FINAL
EXAM!**

Final Exam

Dec. 13, 2022 (Tues) 9:45am to noon