

CHE 327 ORGANIC CHEMISTRY LABORATORY WINTER 2023

COURSE DESCRIPTION

This is a one-semester, 2-credit course that provides a basic organic laboratory experience. It includes techniques of isolating and handling organic substances, as well as biological materials. Lecture will be delivered asynchronously online. All experiments will be conducted in-person.

Prerequisite: CHE 134 or 154. Pre- or Co-requisite: CHE 321 or 331.

Lectures (section 30): Pre-recorded videos that will be posted on Brightspace.

Section L01: TuWThF: 8:30am-12:30pm, Chemistry 342

Section L02: TuWThF: 1:00-5:00pm, Chemistry 342

Instructor: Dr. Zachary E. Katsamanis
Email: zachary.katsamanis@stonybrook.edu
Office hours by appointment

REQUIRED MATERIALS

Important note: you must be prepared with the required material on your first day of lab. We will conduct the first experiment on that day.

- **CHE 327 Organic Chemistry Laboratory Manual Winter 2023** This will be purchased electronically from **LabArchives**, which comes as a bundle of an Electronic Laboratory Notebook (ELN). To sign up for the ELN, use the following URL:
https://mynotebook.labarchives.com/self_signup/MjgzMzAuOXwwLzIxNzkzL0NvdXJzZS8zMjM0MTQxMjA0fDcxOTE2Ljk=
- **A web enabled device (not required but strongly recommended).** You will be viewing the procedures and recording your observations using the ELN, which you will access online. Based on prior semesters, we observed that most students brought their own laptop or pad. The stockroom will provide equipment if you need it.
- **Safety goggles that are in compliance with the latest Z87.1 Standard for Occupational and Educational Eye and Face Protection established by ANSI.** Be sure you purchase chemical splash goggles and not a less effective kind of eye protection.
- **Heavy-duty gloves.** Lab Safety Supply Neoprene Gloves are recommended as they resist a broad range of organic and inorganic chemicals. Playtex Living Gloves are also satisfactory and probably the cheapest available. They can be found at a grocery store or home improvement store.
- **Nitrile gloves (not required but recommended).** Disposable gloves to keep your hands clean when conducting experiments. They can be found at any superstore or home improvement store.
- **Combination padlock.** This will be used to lock your lab drawer. A padlock requiring a key to open it will not be accepted.
- **Appropriate clothing for lab.** You should wear clothing and shoes that will cover your entire body. You will be provided a lab coat during check-in, which you will be required to wear during lab. The specifics are covered in the 'safety' lecture video. Failure to adhere to the personal protection safety rules will result in an automatic absence and/or grade penalty.

TECHNICAL REQUIREMENTS

This course uses Brightspace (CHE 327.30) for posting announcements, documents, videos and grades. The Brightspace course site can be accessed at <https://it.stonybrook.edu/services/brightspace>. If you are unsure of your NetID, visit <https://it.stonybrook.edu/help/kb/finding-your-netid-and-password> for more information. You are responsible for having a reliable computer and Internet connection throughout the term. You should download the Brightspace app so that you receive a notification whenever an announcement is posted.

The following list details a minimum recommended computer set-up and the software packages you will need to have access to, and be able to use:

- PC with Windows 10 or higher (we recommend a 3-year Warranty)
- Macintosh with OS 10.11 or higher (we recommend a 3-year Warranty)
- Latest version of Chrome or Firefox; Mac users may use Chrome or Firefox. (A complete list of supported browsers and operating systems can be found on the My Institution page when you log in to Brightspace.)
- High speed internet connection

Technical Assistance:

If you need technical assistance at any time during the course or to report a problem with Brightspace you can:

- Phone: 631-632-9800 (client support, Wi-Fi, software and hardware)
- Submit a help request ticket: <https://it.stonybrook.edu/services/itsm>
- If you are on campus, visit the Walk-Up Tech Support Station in the Educational Communications Center (ECC) building.

COURSE STRUCTURE

Prior to each experiment, you will be required to read the background sections of the manual, view one or more pre-recorded lecture videos on Brightspace (Echo 360), and read through the experimental procedure on your ELN. When you come into lab, you will first take an 8-minute pre-lab quiz, followed by performing the experiment. During each experiment, you will input your notes/observations in your ELN electronically. Your notes/observations must be submitted before the end of your lab period. You must confirm your submission with your TA at the end of each lab.

Two in-person theory quizzes will also be administered. Details for each course component are described in its corresponding section.

RESPONSIBILITIES

Each student is responsible for knowing all procedures and course expectations detailed: in this document, the Lab Manual (on LabArchives), on Brightspace or those announced in the online lectures or during lab. **To receive the most recent email notice and/or announcement through Brightspace, you must check Brightspace announcements (we strongly suggest download the app to receive notifications).**

There will usually be two types of lectures to watch before each lab: one will describe a laboratory technique and another discussing the specifics of the experiment that will be conducted. Failure to view the online lectures is not an excuse for not knowing what was presented or announced. It is your responsibility to find out about all course information.

GRADING

You will be graded relative to other students. We will not have a curve, but we will assign grades based on class averages. The total amount of possible points in this course is 500.

1. Pre-lab Quizzes (50 points)

There will be an 8-minute quiz given at the beginning of each lab, which will focus on the experiment of the day. A safety/lab intro quiz will also be administered on the first day of lab, in addition to the experimental quiz. Each quiz will be worth 5 points. The maximum total points earned will be 55, but only the first 50 points will count towards your overall course total. Arriving late to lab will result in reduced time on the quiz or a missed quiz. **There are no make ups for missed quizzes.**

There will be two in-lab quizzes given on the first day (Jan. 3).

2. Lab Experimental Reports, Results and Products (190 points)

Each experiment will be accompanied with a report containing a few questions that will be completed on LabArchives. The first six experiments will be worth 20 points each. The *Ester* experiment will be worth 30 points and the final *Lidocaine* experiment worth 40 points. The reports on your ELN will be submitted online before the due date listed in the schedule. Some experiments will also involve submitting a product (or TLC plate) for evaluation, which will be part of the 20 (30 or 40) report points. Products and TLC results would always be submitted before the end of your lab period on the due date listed in the schedule.

If you are in a situation where you must decide between greater purity vs. greater yield of your product, be aware that **purity will be worth more**. A special case is **getting a refill from the stockroom: a zero or low yield grade will be assigned**. Sometimes the choice is yours as to whether to proceed with what you have or to start over. You might decide to take the yield penalty if the refill gives you a chance to obtain a significantly purer product.

No grade will be dropped. Instead, the value of your lowest report grade (out of the first 7 reports) will be adjusted at the end of the course.

3. Notebook Assessments (130 points)

Your note-taking skills will be formally assessed three times during the semester. We will look for specific entries made during experiments. More detail will be provided in a lecture video. A "Notebook Tips" file can be found on Brightspace. **Notebook entries must be submitted before your lab period ends or a grade penalty will be applied. In some cases, it may affect your notebook assessment grade.**

4. Theory Quizzes (100 points)

There will be two one-hour long quizzes on theory and practice administered at 12:15 pm on Tuesday, January 10 and on Wednesday, January 18. **A cumulative makeup theory quiz will be offered on Friday, January 20 if you miss one of the theory quizzes with an acceptable excuse. Missing both theory quizzes will result in an Incomplete.**

5. Technique (30 points)

You should endeavor to prepare thoroughly, work independently, show concern for safety, show consideration for others, and display good laboratory practices. You are required to clean up your bench area before you leave the lab. Fifteen minutes before the end of each lab session, all lab work must stop to allow time for cleanup. A document detailing the breakdown of the technique score will be posted on Brightspace.

6. Penalties

You can have points deducted from your overall course total for certain penalties: not having safety goggles or heavy-duty gloves, arriving with inappropriate clothing, forgetting to bring a padlock, or forgetting its combination more than once, and late notebook entries.

WINTER SESSION COURSE POLICIES ON ABSENCE AND LATENESS

Due to the condensed schedule of the winter session, some changes in the course structure and policies were made from the normal CHE 327 course provided during the fall and spring semesters.

You should strive to arrive to your lab session on time. Arriving late affects your pre-lab quizzes. You will be responsible for any announcements that are made before each lab session. Arriving to lab 40 minutes after your scheduled lab time will result in an automatic absence, and you will NOT be allowed to perform the lab experiment that day.

Any classes that are cancelled by the University due to weather will be rescheduled on one of the designated makeup dates (Jan. 7, 9, 14, 21). You would be required to attend lab on that day if such an incident occurs. This could shift the remaining schedule so **your schedule should allow for you to come into lab on ANY designated class makeup day.**

You are required to view every online lecture video and attend every lab session. **If you miss one lab session with an acceptable excuse, then you will be allowed to perform a makeup lab experiment on Friday, Jan. 20.** If you miss more than one lab session, **it will result in an “Incomplete” grade.** You can then perform a makeup lab experiment at the end of the spring semester or summer session, depending on availability. In unusual circumstances, permission for additional accommodation may be granted with official written documentation of the reason for the absence, and approval by the instructor.

Reports will be submitted online. Pay attention to the due dates on the course schedule. **The deadline is always at 8:00am on its due date. No report will be accepted after that time. It is strongly recommended you do not wait till the last hour to submit work to avoid any possible technical issues that may occur.**

Understand When You May Drop This Course:

It is the student's responsibility to understand when they need to consider withdrawing from a course. Refer to the Stony Brook Academic Schedule for dates and deadlines for registration: http://www.stonybrook.edu/commcms/registrar/calendars/academic_calendars.

- [Undergraduate Course Load and Course Withdrawal Policy](#)
- [Graduate Course Changes Policy](#)

STOCKROOM POLICIES

You will check-in glassware and equipment, which you will keep in an assigned drawer. At the end of the semester, the drawer and its contents should be clean and in the condition you received them (other than expendables such as litmus paper). **Failing to check out before the course ends will result in a grade penalty.**

At check-in, you will be required to supply the stockroom with the combination for your padlock. The stockroom reserves the right to open your drawer anytime during the semester.

Equipment you borrow should be returned to the stockroom as soon as practical during the same lab period. Keep in mind that the stockroom **closes fifteen minutes before the scheduled end of the lab period.** If the stockroom is closed so that you cannot return borrowed equipment, you should lock it in your drawer and return it the next period. If another student needs the equipment, the stockroom staff would have to retrieve it.

COURSE SCHEDULE (a summary in calendar format is on Brightspace)

Note: The first experiment will be conducted on your first day of lab. You MUST be prepared with the required material to perform an experiment that day.

Day	Lecture videos (videos that should be viewed prior to each prelab quiz and experiment)	Experiment (procedures on LabArchives. You are also responsible for the background reading)	Report Due Dates 8:00am deadline	Physical Product Due Dates
Jan. 3	1. Introduction to CHE 327 (<i>Lab Manual Introduction, Lab Equipment</i>) 2. Safety 3. Notebook tips 4. Distillation 5. Distillation of acetone/butanol	Check-in Simple distillation (note: two pre-lab quizzes)		
Jan. 4	6. Large-scale crystallization 7. Benzoic acid crystallization	Crystallization of benzoic acid	Notebook assessment 1 after first two lab sessions	
Jan. 5	8. Extraction of trimyristin from nutmeg	Complete crystallization lab Trimyristin from nutmeg	Simple distillation report	Benzoic acid product
Jan. 6	9. Melting point 10. Myristic acid experiment	Complete trimyristin lab Synthesis of myristic acid	Crystallization report	
Jan. 10	11. Mixed melting point 12. TLC 13. Isomerization of dimethyl maleate	Complete myristic acid lab Isomerization of dimethyl maleate	<i>AM lab ends at 12:00pm</i> <i>PM lab begins at 1:30pm</i>	Trimyristin product TLC plates from isomerization lab
Theory Quiz 1 (Jan. 10 at 12:15pm) – one hour quiz based on the distillation, crystallization, trimyristin and myristic acid experiments, along with safety practices and associated lecture videos (1 – 11). Location to be determined.				

Jan. 11	14. Column chromatography 15. Isolation of β -carotene	Isolation of β-carotene	Trimyristin report	TLC plates from β -carotene lab
Jan. 12	16. Extractions 17. Ester synthesis	Synthesis of a fragrant ester (part A)	Isomerization report Notebook assessment 2	Myristic acid product
Jan. 13	18. Ester purification 19. Infrared spectroscopy 20. Gas chromatography 21. NMR	Synthesis of a fragrant ester (parts B - D)	Myristic acid report β -carotene report	Ester product
Jan. 17	22. Lidocaine synthesis	Multistep synthesis of lidocaine (parts A and B)	Ester report	
Jan. 18	23. Lidocaine isolation and purification	Multistep synthesis of lidocaine (parts C and D) up to part D step 7	<i>AM lab ends at 12:00pm</i> <i>PM lab begins at 1:30pm</i>	
Theory Quiz 2 (Jan. 18 at 12:15pm) – one hour quiz based on the isomerization, β -carotene, ester and lidocaine experiments, along with associated lecture videos (12 – 23). Location to be determined.				
Jan. 19	24. Check out and end-of-course announcements	Multistep synthesis of lidocaine (part D steps 8 and 9) Check-out	Notebook assessment 3	Lidocaine product
Jan. 20		Make-up lab experiment (only for those that missed a lab with an acceptable excuse)	Lidocaine report	
Make-up Theory Quiz (Jan. 20) – cumulative theory quiz based on all content in the course. This quiz is only for those that missed one theory quiz with an acceptable excuse. Location and time to be determined.				

LEARNING OBJECTIVES IN ORGANIC CHEMISTRY LAB

Three fundamental learning objectives of organic chemistry lab are:

1. **Isolation and purification of organic compounds.** Making compounds through reactions is a fundamental aspect in organic chemistry. Conducting most organic chemistry reactions is the easy part. Isolating the product from all of the by-products and solvents of a reaction is usually the most challenging task. The objective is for students to learn the different techniques on how to isolate pure organic compounds in relatively high yield.

This learning objective is evaluated by assessing the purity and yield (amount) of the products submitted by students, as part of each lab report.

2. **Safe handling and disposal of organic compounds.** Most organic compounds present potential health and fire hazards. It is vital for students to learn how to work with these chemicals using proper techniques that avoid or minimize unnecessary exposure of these chemicals to themselves, their peers, and the environment.

This learning objective is evaluated by the teaching assistant observations that will result in a technique grade.

3. **Keeping proper scientific record.** This is the most important learning objective. Most of the students taking this course will go on to have a career in a scientific field, where they will have to record accurate data they obtain without allowing their own analysis to influence what gets recorded. Students will learn the skill of recording observations.

This learning objective is evaluated by notebook assessments that assess what they have recorded in their electronic lab notebooks. This objective is also evaluated somewhat by the teaching assistant observations that will result in a technique grade.

UNIVERSITY POLICIES

Student Accessibility Support Center Statement:

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at sasc@stonybrook.edu. They will determine with you what accommodations are necessary and appropriate. All information and documentation are confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and the Student Accessibility Support Center. For procedures and information go to the following website: <https://ehs.stonybrook.edu/programs/fire-safety/emergency-evacuation/evacuation-guide-people-physical-disabilities> and search Fire Safety and Evacuation and Disabilities.

Academic Integrity Statement:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at http://www.stonybrook.edu/commcms/academic_integrity/index.html

Important Note: Any form of academic dishonesty, including cheating and plagiarism, will be reported to the Academic Judiciary.

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Course Materials and Copyright Statement:

Course material accessed from Brightspace, LabArchives, or a Stony Brook Course website is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder. Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity.

Online Communication Guidelines and Learning Resources:

Maintain professional conduct both in the lab classroom and online. The classroom is a professional environment where academic debate and learning take place. We will make every effort to make this environment safe for you to share your opinions, ideas, and beliefs. In return, you are expected to respect the opinions, ideas, and beliefs of other students—both in the face-to-face classroom and online communication. Students have the right and privilege to learn in the class, free from harassment and disruption. The course follows the standards set in the Student Code of Conduct, and students are subject to disciplinary action for violation of that code. If your behavior does not follow the course etiquette standards stated below, the grade you receive for a posting may suffer. We reserve the right to remove any discussion messages that display inappropriate language or content.

STUDENT RESOURCES

Academic and Major Advising (*undergraduate only*): Have questions about choosing the right course? Contact an advisor today. Phone and emails vary—please see website for additional contact information; website: <https://www.stonybrook.edu/for-students/academic-advising/>

Academic Success and Tutoring Center (*undergraduate only*): <https://www.stonybrook.edu/tutoring/>

Amazon @ Stony Brook: Order your books before classes begin. Phone: 631-632-9828; email: Bookstore_Liaison@stonybrook.edu; website: <http://www.stonybrook.edu/bookstore/>

Bursar: For help with billing and payment. Phone: 631-632-9316; email: bursar@stonybrook.edu; website: <http://www.stonybrook.edu/bursar/>

Career Center: The Career Center's mission is to support the academic mission of Stony Brook University by educating students about the career decision-making process, helping them plan and attain their career goals, and assisting with their smooth transition to the workplace or further education. Phone: 631-632-6810; email: sbucareercenter@stonybrook.edu; website: <http://www.stonybrook.edu/career-center/>

Counseling and Psychological Services: CAPS staff are available by phone, day or night. <http://studentaffairs.stonybrook.edu/caps/>

Ombuds Office: The Stony Brook University Ombuds Office provides an alternative channel for confidential, impartial, independent and informal dispute resolution services for the entire University community. We provide a safe place to voice your concerns and explore options for productive conflict management and resolution. The Ombuds Office is a source of confidential advice and information about University policies and procedures and helps individuals and groups address university-related conflicts and concerns. <http://www.stonybrook.edu/ombuds/>

Registrar: Having a registration issue? Let them know. Phone: 631-632-6175; email: registrar_office@stonybrook.edu; <http://www.stonybrook.edu/registrar/>

SBU Libraries: access to and help in using databases, ebooks, and other sources for your research.

- Research Guides and Tutorials: <http://guides.library.stonybrook.edu/>
- Getting Help: <https://library.stonybrook.edu/research/ask-a-librarian/>

Support for Online Learning: <https://www.stonybrook.edu/online/>