

SYLLABUS - CHEM 243 ORGANIC CHEMISTRY I - FALL 2024

Dr. Ed Brush

(NOTE: The PDF document on the course web page has clickable hyperlinks)

Instructor Information:

- **Where can you find me?** My office is DMF 407
- **How can you meet with me?** Feel free to stop in and chat about class, careers, research, etc.
 - Come to my Office Hours: Monday 11-1 & Tuesday 11-1
 - Make an appointment
 - My door is always “open”, so if you are in DMF feel free to stop by
- **Contact info:** ebrush@bridgew.edu; 508-531-2116
- **Course Web page:** <http://webhost.bridgew.edu/ebrush/>: Lecture and lab syllabi, lab handouts and reading assignments, worksheets, and answer keys.

Class Meetings (DMF 477/481): CHEM 243-001 MWF, 8:00 - 8:50 AM
CHEM 243-002 MWF, 10:10 - 11:00 AM

CHEM 243 Laboratory (DMF 477 & 481): CHEM 243 Labs will begin the week of September 9. **PLEASE NOTE:** All lab students are required to use **Visorgogs** or full-coverage safety goggles in all chemistry laboratories. **Visorgogs** can be purchased at the [bookstore](#) or on [Amazon](#). The goggles are listed in the book requirements for each chemistry lab course on the Bookstore website.



You Belong In This Class!

All students deserve a safe learning environment, and your contributions are important and respected.

You Have A Right To Accommodations!

Accommodations are changes that instructors must make to improve our course delivery and/or assessment tools. If you need accommodations for this course, please contact **Student Accessibility Services** at SAS@bridgew.edu or 508-531-2194.

Your health and safety are my number one priorities!

If you are sick, please do not attend class!

Please complete this [Class Survey](https://forms.gle/3bsDHH3NdyD8os3r6) by Friday, September 6 at 5:00 pm for Bonus Points
(<https://forms.gle/3bsDHH3NdyD8os3r6>)

IMPORTANT DATES:

September 11 (W):	Last day to Drop/Add
October 14 (M):	No classes – Columbus Day/Indigenous Peoples Day
November 11 (M):	No classes – Veterans Day
November 28 & 29:	No classes – Thanksgiving
December 6 (F):	Last day to withdraw
December 11 (W):	Last day of Fall classes
December 12 (R):	Reading Day (CHEM 243 course grades sent to students)
December 13 (F):	CHEM 243-001 Optional Exam V
December 16 (M):	CHEM 243-002 Optional Exam V

DIVERSITY, EQUITY, INCLUSION AND RESPECT

It is imperative, more so now than ever, to address questions related to diversity, equity, inclusion, respect and belonging. We are all aware of numerous insults on human life, but as scientists we must also understand the disproportionate injustices that impact human health and the environment. Diversity, Inclusion, Equity and Belonging are an integral part of the BSU strategic priorities. This is also critical in our CHEM 243 class, as students and instructor will work together to learn the basic concepts of organic chemistry. We will also collaborate on a class project to explore how green chemistry principles and practices will help us identify, understand and address key issues related to environmental justice. In order to alleviate the global environmental and human health impacts that continue to disproportionately burden environmental justice communities, it is imperative that we listen, learn and respect each other.

The field of Green and Sustainable Chemistry is uniquely positioned to provide an understanding of, and contribute solutions to, complex global problems. To accomplish this, we must be able to effectively collaborate with people who have diverse perspectives and life experiences in order to understand the challenges facing the world in the 21st century and develop and apply the strategies needed to help solve them.

I am personally committed to create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). If you feel that your performance in this class is being impacted by your experiences in- or outside of class, please don't hesitate to come and talk with me.

CHEM 243 COURSE DESCRIPTION, LEARNING OBJECTIVES AND GOALS

Course Description. CHEM 243, Organic Chemistry I (4 credits). This is the first semester of an introductory course in organic chemistry designed for students majoring in biology, chemistry, and the geological sciences. CHEM 243 carries four credits earned by three hours of lecture, one hour of recitation, and three hours of laboratory work weekly.

Prerequisite: minimum C- grade in CHEM 142.

Learning Outcomes CHEM 243 Organic Chemistry I Lecture. Students who successfully complete this course will be able to...

- Apply the basic principles that govern covalent bonding concepts to the structure of organic compounds including the octet rule, Lewis structures, formal charge, hybridization and resonance;
- Recognize families of organic compounds based on their functional groups, and apply nomenclature rules to draw formulas, structures, and write the names of organic compounds;
- Explain the role of chemical structure, hybridization, resonance and inductive effects on acid/base strength, and apply acid/base theory to correlate structure and reactivity in the context of the reactions and mechanisms of organic compounds;
- Use molecular and/or computational models, structural drawings, and proper terminology to describe the conformations of alkanes and cycloalkanes, to distinguish stable versus reactive molecular conformations, and to explain chemical reactivity;
- Apply the concepts of isomerism and chirality in organic chemistry; draw and name structures and construct models of constitutional, conformational, cis-trans, and stereoisomers; recognize and assign configurations; draw Fischer Projections;
- Apply knowledge of functional group reactivity to propose reasonable mechanisms for basic organic chemistry reactions using “curved arrow” designations, and apply knowledge of reaction mechanism to predict and explain the outcome of a reaction, relative reactivity, and stereochemistry.

Goals of this Course. Organic Chemistry is the “*Chemistry of Life*”, and is essential for students pursuing careers in the biological, chemical, environmental, health and medical sciences, as well as biochemistry, genetics, the pharmaceutical sciences and medicinal chemistry. You may want to consider working on a research project in Biochemistry, Green Chemistry, or Chemical Sustainability as the discipline is rich in basic research that has led to numerous advances in biomedicine, the design and synthesis of modern materials, and development of safer products for society. Examine your surroundings; almost everything around you is composed of organic molecules, including the biomolecules in your own body, not to mention the numerous bioorganic reactions occurring in all living organisms.

My goals are to help you develop:

- I. A solid foundation in the basic facts and concepts of organic chemistry;
- II. The confidence to work together collaboratively in solving problems; and
- III. An understanding that the field of organic chemistry is dynamic, exciting and essential to all life processes.

This will be accomplished through the following objectives in the lecture and laboratory:

- 1) This course will help you build a solid foundation of facts and fundamental principles in organic chemistry that you will be able to apply to intermediate and advanced courses in biology, biochemistry, chemistry, and geological sciences, as well as to research in any of these fields;
- 2) Through *student-centered learning* you will develop the confidence to take charge of your own learning by working together with other students to develop skills in problem solving, critical thinking and decision making as you collaboratively discover new information and solve problems.
- 3) The lab portion of the course will clarify some concepts discovered in lecture, and will help you develop confidence to apply laboratory methods to conduct research and create new knowledge in organic chemistry;
- 4) You will gain a better appreciation of how collaborating with other students who have diverse backgrounds, life experiences and skills can help you to use your chemistry content knowledge to identify and understand big global problems, and contribute to their solutions.

CHEM 243 COURSE REQUIREMENTS AND RESOURCES

Attendance and Group Work Policy. Class Attendance is critical to your success! In our “flipped” classroom you have a responsibility to your group to come to class prepared, and actively engage in problem solving. We cover material at a rapid pace and if you fall behind it is very difficult to catch up. ***I expect you to attend class each day and arrive on time.***

- I do track attendance through daily worksheets, and make note of late arrivals.
- I do not penalize students who **occasionally** miss class or arrive late. If you miss excessive class work, I will request a meeting to talk about how we can do better.
- As we have group worksheets in every class, you will lose worksheet points if you miss an excessive number of classes, or arrive to class late. To get full credit for a worksheet it must be done in collaboration with your group.
- Group work and collaboration with your team is critical to your success. There will be a peer evaluation at the end of the semester where you will be evaluated by your peers based on how you contributed to group work.

Missing Class Due to Illness or Personal Emergency. If you are ill, **DO NOT come to class!** Stay away and rest! You can make up missed work as follows:

- Send me an email **AT LEAST ONE HOUR BEFORE CLASS.**
- I will send you the class worksheet by email.
- You must be able to print, complete the worksheet, and email me a PDF copy by 5 pm.
- The **Genius Scan** app will use your phone’s camera to make a PDF document of the worksheet.
- I WILL NOT accept photos of your worksheet.
- You can use this make-up option up to three times during the semester.

PLEASE NOTE that all students will also be able to earn “Bonus Points” that will offset missed worksheets and/or low scores on daily worksheets. All students will have the opportunity to “bank” at least 30-40 points that will offset three or more missed worksheets.

I encourage all students to bring a laptop/tablet to every class. You can use your computer to answer questions on worksheets and for project work. All students are expected to have access to a computer and the technology to access the internet.

Required Software. Many of the worksheets and other documents for our class are in **Microsoft Word or Adobe PDF.** You will also need to access **Microsoft Teams.** You must have these applications in order to open and work with class documents. You can download the Microsoft Office Suite here: <https://www.bridgew.edu/ccs/online/student/technical-requirements>.

Course Resources. All course resources (class videos, documents) can be accessed through my CHEM 243-244 course webpage: <http://webhost.bridgew.edu/ebrush/>.

E-mail. You are responsible for all e-mail communications sent by your instructor and your classmates to your BSU e-mail account. It is important that you check your BSU e-mail every day.

Peer Leader Office Hours. The organic chemistry Peer Leaders will hold office hours and/or review sessions to help you master course material covered during the week.

Textbook Requirement. There are numerous on-line resources for learning organic chemistry. For this reason, I do not have specific textbook requirement. *However all students are required to identify an organic chemistry resource to help you succeed in this course.* Here are some options (also listed on the course web page):

- CHEM 243-244 Organic Chemistry Web Page (<http://webhost.bridgew.edu/ebrush/>).
- Buy a used organic chemistry text on-line (check with me before buying).
- Sign-out an organic chemistry textbook from Dr. Brush
- Here are two good on-line resources:
 - [Khan Academy Organic Chemistry \(videos\): \(https://www.khanacademy.org/science/organic-chemistry\)](https://www.khanacademy.org/science/organic-chemistry)
 - [LibreTexts Organic Chemistry Textbook: https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_\(Wade\)_Complete_and_Semesters_I_and_II/Map%3A_Organic_Chemistry_\(Wade\)](https://chem.libretexts.org/Bookshelves/Organic_Chemistry/Map%3A_Organic_Chemistry_(Wade)_Complete_and_Semesters_I_and_II/Map%3A_Organic_Chemistry_(Wade))

Course Notebook. All students are required to take hand-written notes and maintain a notebook or binder for your course material. You are expected to bring your notebook to class every day. There will be unannounced checks of your course notebook for Bonus Points.

Responsibilities of the student. By registering for this course, you have accepted the responsibility expected of all BSU students: *it is the student's responsibility to take the initiative to learn the course material!* Examples include:

- respecting your classmates, Peer Leaders, and the course instructor
- coming to class and lab prepared and on time
- taking exams as scheduled
- notifying the course instructor ahead of time if you will miss a class
- collaborating on worksheet problems in class
- keeping an up-to-date lecture notebook
- turning in assignments on time
- taking advantage of office hours

Responsibilities of the instructor. I will be as accessible as is reasonably possible, and it is my responsibility to provide all students with every opportunity to master the material covered in this course.

GRADING POLICY – Subject to Change!

Grading Instrument	Points	% of final grade
Group Worksheets (10 points each worksheet, scaled to 150 points)	150	15%
Exams (individual, 4 x 150 points each)	600	60%
Group Project	100	10%
Lab grade	150	15%
TOTAL	1000	100%

Final Grade. Assigned at the end of the semester based on the following scale: A's (90+), B's (80-89), C's (70-79), D's (60-69), F (<60). All graded work will be assigned a numerical score that will not be curved. **Note: an "A" grade requires a 95% average, and a "C-" requires a 70% average.**

Return of Course Work to Students. I will return graded work to you as quickly as I can. I will not list your grades in Blackboard so its important that you keep your own record of graded work. All worksheets, exams and answer keys will be posted to the course web page.

Group Worksheets. Your goal is to earn 150 “Worksheet Points” (15% of your grade). This can be accomplished by:

- Daily group worksheets in class. You will collaborate with your group on each worksheet for a group grade. Group worksheets may NOT be done individually or outside of class. **Point deductions will be made if you arrive late or leave early.**
- My worksheets are designed with the assumption that you have: (1) watched the videos, (2) taken notes, (3) have your notebook open on your bench, and (4) are working with your group in solving worksheet problems.
- **Bonus Points.** These will be used to replace missed worksheets and/or low worksheet grades. There will be opportunities to earn Bonus Points through the semester, including:
 - Class Survey
 - Worksheet “Zero” - a review of key concepts from CHEM 141-142
 - Bonus questions on group worksheets
 - Maintaining an up-to-date course notebook

EXAMS

- There will be a total of four exams (150 points each), each scheduled on a Friday, that must be done individually. You will be provided with a detailed Study Guide that lists the topics covered on each exam. There will also be an in-class review the Wednesday prior to each exam.
- If you miss an exam, you can take a make-up exam on the Monday following the scheduled exam date. Each student gets **one make-up exam, but only if you provide documentation for an illness or an emergency.** If you miss additional exams, for any reason, you will get a zero score.
- Please note that all students have the option to replace your **lowest** exam grade by taking the optional “Exam V” at the end of the semester. There is no formal final exam.
- **Optional “Exam V”.** On Reading Day, I will notify each student about their “final” course grade. Students will then have the option of accepting that “final” grade, or taking “Exam V” to replace their lowest exam grade and improve their final grade. Exam V will be given during the final exam period, will be the same length and format as a semester exam, you will have the same amount of time (50 minutes), and you will be told in advance what topics will be covered.

FLIPPED CLASSROOM

In the flipped classroom, basic information will be made available prior to class through short, YouTube video “lectures”. URL links to these videos are posted on the class web page and allow students to learn from anywhere, and at your own pace. This way we can spend valuable class time making sense of the material through problem solving! You can discuss course concepts with other students, the Peer Leaders, and the course instructor.

For you to take full advantage of the flipped classroom the following points are critical:

- For each class you will be assigned 1-3 lecture videos (see schedule below).
- **Before coming to class,** you will watch the videos and **take notes in your required course notebook.**
- You may not watch lecture videos during class.
- **During class,** you will work together in groups of 3-4 students on class worksheets for a group grade. Group worksheets may NOT be done individually or outside of class.
- My worksheets are designed with the assumption that you have:
 - (1) watched the videos **BEFORE** coming to class
 - (2) taken notes in your required notebook
 - (3) have your notebook open on your bench, and
 - (4) are working with your group in solving worksheet problems.

- **Point deductions will be made:**
 - If you consistently arrive to class late or leave early.
 - If you watch the assigned videos during class time.
- Worksheets and answer keys will be posted to the class web page by 5 pm on each class day, so you can practice and review.
- If you are consistently unprepared for class, I will request a meeting to discuss how we can do better.

Flipped Class Advantages:

- Learning becomes a shared responsibility between students and instructor
- Flexible learning environment that goes where you go
- You can learn at your own pace
- You can catch up on missed work
- You can review at any time
- We can spend more class time for in-depth learning and discussion
- Instructor works more closely with students
- Improved engagement and collaboration between students



Edited graphic from ViewSonic: <https://www.viewsonic.com/library/education/what-is-the-flipped-classroom-model/>

CHEM 243-244 Class Project: Green Chemistry Contributions to Addressing Issues of Environmental Justice.

The class project requires: (1) group work, (2) the reading of assigned material or watching assigned videos outside of class, (3) the completion of group work in your MS Teams e-notebook, and (4) a group presentation at the Mid-Year Symposium.

What are some of the big societal problems in the world today? Who is most affected by these issues? Is there a role for chemistry in identifying, understanding, and solving these problems? In our CHEM 243 class, you will be engaged in a class project to explore big, global problems, and investigate how *green and sustainable chemistry* can provide solutions. Our context comes from the [UN Sustainable Development Goals](#) (SDGs), the world's "to-do" list, that offers an agenda to address world-wide challenges of poverty, protecting the planet and ensuring prosperity.

Chemists must play a key role in achieving these goals. As part of our normal class work you will identify examples of environmental justice and/or climate justice, and learn how green and sustainable chemistry may contribute solutions. You will each learn to appreciate the unique skills that individual students can bring to a project team, and apply your chemistry knowledge to understanding the challenges and opportunities of carbon capture. Outcomes of this project include:

- Your group will present your project at the BSU StARS Symposium. Your group will work together preparing and giving a presentation on the class project. This presentation grade will be part of your Project Grade.
- Be able to answer the question on how organic chemistry can contribute to solving global problems.

CHEM 243 TOPICS AND WEEKLY SCHEDULE – Subject to Change!

Videos 1-1 to 1-3	Review: Bonding and Molecular Structure
Videos 2-1 to 2-5	Families of Carbon Compounds: Functional Groups, Intermolecular Forces, IR Spectroscopy
Videos 3-1 to 3-5	An Introduction to Organic Reactions and Mechanisms: Acids and Bases
Videos 4-1 to 4-6	Nomenclature and Conformations of Alkanes and Cycloalkanes
Videos 5-1 to 5-7	Stereochemistry: Chiral Molecules
Videos 6-1 to 6-9	Ionic Reactions: Nucleophilic Substitution and Elimination Reactions of Alkyl Halides
Videos 7-1 to 7-6	Alkenes and Alkynes I: Properties and Synthesis. Elimination Reactions of Alkyl Halides
Videos 8-1 to 8-3	Alkenes and Alkynes II: Addition Reactions
Videos 11-1 to 11-4	Alcohols, Ethers and Epoxides: Synthesis and Reactions

Dates	CHEM 243 Videos	Classwork
September 4 (W)	Introduction; Review of CHEM 142 topics	Worksheet “Zero” (Review)
September 6 (F)	1-1, 1-2, 1-3; Review of CHEM 142 topics	Worksheet “Zero”; Class Survey Due
September 9 (M)	1-1, 1-2, 1-3	Worksheet #1; Worksheet “Zero” Due
September 11 (W)	2-1, 2-2, 2-3; LAST DAY TO DROP/ADD	Worksheet #2
September 13 (F)	2-4 & 2-5	Worksheet #3
September 16 (M)	Group Project Work	Project-1
September 18 (W)	3-1, 3-2, 3-3	Worksheet #4
September 20 (F)	3-4 & 3-5	Worksheet #5
September 23 (M)	EXAM I REVIEW	Worksheet #6
September 25 (W)	EXAM I REVIEW	Worksheet #7
September 27 (F)	Exam I	
September 30 (M)	Group Project Work	Project-2
October 2 (W)	4-1 & 4-2	Worksheet #8
October 4 (F)	4-3 & 4-4	Worksheet #9
October 7 (M)	4-5 & 4-6	Worksheet #10
October 9 (W)	Group Project Work	Project-3
October 11 (F)	5-1 & 5-2	Worksheet #11
October 14 (M)	No classes – Columbus Day/Indigenous Peoples Day	
October 16 (W)	5-3 & 5-4; MONDAY SCHEDULE	Worksheet #12
October 18 (F)	5-5 & 5-6	Worksheet #13
October 21 (M)	5-7 & REVIEW	Worksheet #14
October 23 (W)	EXAM II REVIEW	Worksheet #15
October 25 (F)	Exam II	
October 28 (M)	Group Project Work	Project-4
October 30 (W)	6-1	Worksheet #16
November 1 (F)	6-2 & 6-3	Worksheet #17
November 4 (M)	6-4 & 6-5	Worksheet #18
November 6 (W)	6-6 & 6-7	Worksheet #19
November 8 (F)	6-8 & 6-9	Worksheet #20
November 11 (M)	No classes – Veterans Day	
November 13 (W)	7-1 & 7-2	Worksheet #21
November 15 (F)	7-3 & 7-4	Worksheet #22
November 18 (M)	7-5 & 7-6	Worksheet #23
November 20 (W)	EXAM III REVIEW	Worksheet #24
November 22 (F)	EXAM III	
November 25 (M)	8-1, 8-2, 8-3	Worksheet #25
November 27 (W)	11-1 & 11-2	Worksheet #26
November 28 (R) & 29 (F)	No classes - Thanksgiving	
December 2 (M)	11-3 (start watching at 5m12s), 11-4	Worksheet #27
December 4 (W)	EXAM IV REVIEW	Worksheet #28
December 6 (F)	EXAM IV	
December 9 (M)	Group Project Work	Project-5
December 11 (W)	TBA	
December 12 (R)	Reading Day (Course grades available)	
December 13 & 16	Optional “Exam V”	8:00 AM

BSU RESOURCES FOR STUDENT SUCCESS

The Academic Achievement Center. The AAC provides students with academic services and resources that propel them toward successful and timely degree completion. The AAC is the largest hub of student academic services on campus, offering services both online and in-person. The AAC is comprised of four major support areas: Academic Advising (first-semester freshmen), Student Accessibility Services, Learning Assistance (Academic Coaching and Tutoring), and Testing Services.

Learning Assistance (LA) consists of both Academic Coaching and Tutoring. Tutoring areas include: Math Services, the Accounting & Finance Lab, Writing Studio, Tutoring Central (100/200 introductory and Core Curriculum courses), and Second Language Services. To make an appointment for Tutoring or Academic Coaching, please sign into our platform, [Accudemia](#), using your BSU credentials.

Student Accessibility Services. As a member of the Bridgewater State University community, it is my goal to create a learning experience that is accessible for all students – including those with disabilities. BSU’s commitment to students with disabilities is not only shaped by legal requirements but is also driven by our commitment to social justice and ensuring a fully accessible University experience to our community. Students with disabilities are encouraged to collaborate with Student Accessibility Services to confidentially explore accommodations and other resources available to them. SAS can be reached at SAS@bridgew.edu or 508.531.2194.

Student Code of Conduct. The Student Code outlines expectations for student conduct, including provisions related to the University's COVID-19 Safe Return Plan. Bridgewater State University is a community dedicated to the lifelong success of all students. All students are expected to adhere to the core values of the university community which include civility, fairness, inclusivity, and respect for others’ dignity. The *Student Code of Conduct* defines the rights and responsibilities of students and provides a process for responding to allegations of student misconduct in a way that aligns with [the university’s values](#).

Title IX and Sexual Violence

The Office of Equal Opportunity and the Title IX Coordinator work to ensure that all members of the campus community flourish in a supportive and fair climate. See <https://studentbridgew.sharepoint.com/sites/OfficeofEqualOpportunity> to learn more. To learn more about Title IX please visit: <https://www.bridgew.edu/office/titleix>. The Sexual Violence Advocacy and Support Center is a *confidential* support resource for all community members who have experienced sexual, gender-based, or relationship violence and stalking. Students seeking support can fill out this form: [SVAS Center Support Form \(maxient.com\)](#)