

Fall 2019

# CHEM 243-003: Organic Chemistry I

Yuanwei Zhang

Follow this and additional works at: <https://digitalcommons.njit.edu/chem-syllabi>

---

## Recommended Citation

Zhang, Yuanwei, "CHEM 243-003: Organic Chemistry I" (2019). *Chemistry and Environmental Science Syllabi*. 87.  
<https://digitalcommons.njit.edu/chem-syllabi/87>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Chemistry and Environmental Science Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact [digitalcommons@njit.edu](mailto:digitalcommons@njit.edu).

## Chemistry: *Fall 2019 Course Syllabus*

**NJIT Academic Integrity Code:** All Students should be aware that the Department of Chemistry & Environmental Science (CES) takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

### COURSE INFORMATION

**Course Description:** This course offers students the opportunity to learn the nature of carbon in organic compounds. It presents general principles of organic chemistry related to nomenclature, structure, stereochemistry, uses and synthesis.

**Number of Credits:** 3

**Prerequisites:** General Chemistry

#### Course-Section and Instructors

Course-Section	Instructor
CHEM - 003	Yuanwei Zhang
CHEM - HM1	Yuanwei Zhang

**Office Hours for All Chemistry & Environmental Science Instructors:**

**Required Textbook:**

<b>Title</b>	Organic Chemistry
<b>Author</b>	L. G. Wade Jr.
<b>Edition</b>	9 <sup>th</sup> edition
<b>Publisher</b>	Prentice Hall
<b>ISBN #</b>	032197137X

**University-wide Withdrawal Date:** The last day to withdraw with a W is Monday, November 11, 2019. It will be strictly enforced.

### Learning Outcomes:

1. Identify sigma and pi bonds and explain the hybridization of the molecules
2. Discuss electronegativity and bond polarity
3. Draw Lewis structures, condensed structures and structural formulas of organic compounds
4. Use VSEPR to predict the geometry and polarity of molecules
5. Discuss resonance and delocalization of charge in molecules
6. Identify various functional groups in organic molecules, particularly alkenes, alkynes, alcohols, acids, ethers, esters, aldehydes, ketones and amines
7. Explain Lewis acid-base theory
8. Explain rules of nomenclature to describe the various hydrocarbons
9. Describe structural and geometric isomerism and the role of isomerism in determining molecule structure
10. Describe types of intermolecular forces
11. Apply knowledge of intermolecular forces to describe trends in boiling points and melting points of various molecules
12. Distinguish between conformers and isomers
13. Describe key reactions of alkanes (substitution), alkenes and alkynes (addition)
14. Identify chair and boat conformations of cyclohexane and predict the stability of the different conformers
15. Recognize the steps involved in free radical reactions
16. Identify and describe the reactivity of various intermediates produced during reactions of hydrocarbons
17. Propose reaction mechanisms to describe product formation in simple alkane substitution reactions
18. Describe chirality and distinguish between R and S stereoisomers and diastereoisomers
19. Discuss and draw the products of substitution and elimination reactions of alkyl electrophiles
20. Describe substitution reactions and recognize SN1 and SN2 reactions
21. Explain E1 and E2 reactions
22. Describe various types of addition reactions in aliphatic alkenes and alkynes
23. Describe properties, synthesis and reactivity of alcohols
24. Explain various organic reagents like Grignard reagents and borohydrides and their uses in specific reactions

## POLICIES

All CES students must familiarize themselves with, and adhere to, all official university-wide student policies. CES takes these policies very seriously and enforces them strictly.

**Grading Policy:** The final exam will be cumulative. Before each Exam there will be a Quiz, which covers one or two chapters. Take the Quizzes seriously as they add up to one Exam grade. There may be a fourth quiz depending on time. If there is a fourth quiz one quiz will be dropped. Problems in the body of the chapter are assigned and selected problems at the end of the chapter. These will not be collected. You have answers to these problems. To do well in the course it is important to do these problems. You must bring a photo ID to the exam and take the exam in the room assigned to you by the course coordinator. Failure to take the exam in the assigned room will result in a loss of a full grade from your exam score. The final grade in this course will be determined as follows: The grade will be determined from a total of 400 points. 100 points will be dropped from the total of 500 points, either the quizzes (100 points) or the lowest of the three exams (The final exam cannot be dropped). Makeup exams are not encouraged. If you must miss an exam contact the coordinator before the exam or immediately after. Makeup should be taken within the first week of the exam and before exams are given back. You must have a valid excuse and a doctor note. The final grade in this course will be determined as follows:

Quizzes	100
Midterm Exam I	100
Midterm Exam II	100
Midterm Exam III	100
Final Exam	200

Your final letter grade in this course will be based on the following tentative curve:

A	90 - 100	C	70 - 74.9
B+	85 - 89.9	D	60 - 70
B	80 - 84.9	F	< 60
C+	75 - 79.9		

**Attendance Policy:** Attendance at classes will be recorded and is **mandatory**. Each class is a learning experience that cannot be replicated through simply “getting the notes.”

**Homework Policy:** Homework is an expectation of the course. The homework problems set by the instructor are to be handed in for grading and will be used in the determination of the final letter grade as described above.

**Exams:** There will be two midterm exams held in class during the semester and one comprehensive final exam. The following exam periods are tentative and therefore possibly subject to change:

Midterm Exam I	September 25
Midterm Exam II	October 23
Midterm Exam III	November 18
Final Exam Period	December 14 - 20, 2019

The final exam will test your knowledge of all the course material taught in the entire course.

**Makeup Exam Policy:** There will normally be **NO MAKE-UP QUIZZES OR EXAMS** during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor’s note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed so that appropriate steps can be taken to make up the grade.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

## ADDITIONAL RESOURCES

**Chemistry Tutoring Center:** Located in the Central King Building, Lower Level, Rm. G12. Hours of operation are Monday - Friday 10:00 am - 6:00 pm. For further information please click [here](#).

**Accommodation of Disabilities:** Office of Accessibility Resources and Services (*formerly known as Disability Support Services*) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at **973-596-5417** or via email at [lyles@njit.edu](mailto:lyles@njit.edu). The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

- <http://www5.njit.edu/studentuccess/disability-support-services/>

**Important Dates** (See: [Fall 2019 Academic Calendar, Registrar](#))

Date	Day	Event
September 3	T	First Day of Classes

September 13	F	Last Day to Add/Drop Classes
November 11	M	Last Day to Withdraw
November 26	T	Thursday Classes Meet
November 27	W	Friday Classes Meet
November 28 - December 1	R - Su	Thanksgiving Break - University Closed
December 11	W	Last Day of Classes
December 12-13	R - F	Reading Day
December 14-20	Sa - F	Final Exam Period

## Course Outline

Lecture	Section	Topic	Assignment
1-2	1	Introduction and Review	
3-4	2	Structure and Properties of Organic Molecules	
5-6	3	Structure and Stereochemistry of Alkanes	
7-8	4	The Study of Chemical Reactions	
9-10	5	Stereochemistry	
11-12	6	Alkyl Halide, Nucleophilic Substitution and Elimination	
13-14	7	Structure and Synthesis of Alkenes	
15-16	8	Reactions of Alkenes	
17-18	9	Alkynes	
19-20	10	Structure and Synthesis of Alcohols	
21-22	11	Reactions of Alcohols	
23-24	12	Infrared Spectroscopy and Mass Spectrometry	
21			
22			
23			
24			
25			
26			
27			
28			