

LAGUARDIA COMMUNITY COLLEGE  
CUNY NATURAL SCIENCES DEPARTMENT

Organic Chemistry 251

Section

Spring 1 2017

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**Course Description:**

This course is part I of a two-semester sequence emphasizing the synthesis, structure, reactivity and mechanisms of reaction of organic compounds. This course will include a methodical study of alkanes, alkenes, alkynes, alkyl halides, alcohols, stereochemistry, substitution reactions, and elimination reactions.

The Laboratory stresses basic organic chemistry techniques.

The prerequisites are: MAT096/MAB096, and SCC202.

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**Some Advice:**

"ORGO." You've heard horror stories about it, you've had nightmares about it and now you're in the class! Before you switch majors, "Orgo" doesn't have to be all that terrifying. The question is why are you taking this course? The majority of you will say you need organic chemistry to "get into that school, get that degree or get that job." In other words you need it to realize your career objectives. You and I both know that once you finish your year of organic you will forget all about carbon, nomenclature, reactions and mechanisms. So what is *really* the point? Organic chemistry teaches you how to solve problems in ways you may not have thought of before. It teaches you to learn a concept, absorb the concept then manipulate the concept in different ways to solve a problem you have never been exposed to before. This is a little different than "Gen Chem", where you have equations or you can derive a different equation to solve a problem. Here you need to find the best theory or model to solve the problem at hand—and there may be more than one approach to the answer, more than one synthesis route to get the compound or more than one mechanism to explain the product. Organic chemistry is challenging; no doubt about it. I will ask you questions not found in any book and not searchable on Google. You will learn not to be afraid to tackle and solve problems on your own with no "solutions manual".

My promise to you is that organic chemistry will help you acquire and improve your problem-solving skills and critical thinking skills—skills that are highly valued across all professions and anyone who is truly successful needs to develop these skills to solve problems.

Here is some advice for getting you through the first semester;

- Don't memorize. Success in this course as in life is based on understanding WHY. WHY the reactions happen and how mechanisms occur. Many of the concepts in this course will become clear after you've had a chance to analyze and review. This review period is *essential*, therefore you need to schedule regular study periods of at least 4 hours per day. As the semester progresses cramming will be impossible.
- Take notes and re-write them. Write, re-write, re-write again then analyze your notes! Listening to lectures and looking at PowerPoint slides will lull you into thinking that you understand the material but not so; only by writing and again re-writing the notes will you truly understand the ideas and reactions.
- Form study groups with your colleagues, network! You will be amazed at how much you can help each other. And work on solving additional problems within the chapter or in **Connect** for more practice. Create your own exam questions. Use flash cards or index cards on the train or bus.
- Make the most of the resources you have available, including other text books, online sites, tutoring and OFFICE HOURS! Do not wait till the day before a major exam to find me—that will be too late!

There is a brilliant organic chemistry professor, Brian Coppola at University of Michigan and he tried to find out what was the "magic" combination of things that students did (tutoring, online resources, re writing notes, study groups, etc.) in order to get B+ or better in organic. After 20 years he could find no magic combination-----but what the unpublished study did show was that as long as the student did **6 activities** outside the class consistently then their grades were far and above their peers' grades. I suggest making a list of what strategies you will use to tackle organic chemistry, make sure you use at least 6 techniques!

List of **activities** pick any 6 or develop your own;

- Read other text books
- Summarize the material as you read
- Re-write notes several times
- Create concept maps
- Form study groups
- Do varied homework problems
- Attend tutoring
- Take practice exams
- Find online resources
- Take quizzes
- Create outlines
- Develop flash cards

Finally, stay focused and involved. If you give organic chemistry a chance we can make it really fun. Good Luck!

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### **Text and Other Materials:**

**Text:** Organic Chemistry 10th edition, Francis A Carey, Robert M. Giuliano, McGraw Hill 2017.

**Lab Manual:** Macroscale and Microscale Organic Experiments 6th edition, Kenneth L Williamson, Houghton Mifflin, 2008.

**Lab Book:** Bound laboratory notebook.

**Software:** subscription to McGraw-Hill Connect:

**<http://connect.mheducation.com/class/scc-251-170a>**

This program will be used for homework and reading assignments

**Safety Goggles:** All students are required to bring safety goggles to EVERY lab

session

**Scientific Calculator:** All students are required to have their own calculator, not cell phone calculators. Borrowing calculators will not be allowed during exams

**Study Guides:** Solutions Manual for Organic Chemistry 10<sup>th</sup> Edition, F. Carey, McGraw-Hill (optional).

Pushing Electrons: A Guide to Students of Organic Chemistry, 3rd edition, Daniel P. Weeks (optional).

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### **Instructional Objectives:**

Successful students will learn, understand and be able to apply the following concepts; Bonding, molecular orbital theory, orbital hybridization, molecular shapes and polarities of molecules. Acid-Base theory. Stereochemistry and Stereoisomerism. Application of thermodynamic and kinetic concepts to organic reactions. Nucleophilic substitution and elimination reactions. Nomenclature, structure, properties and synthesis of the following compounds; alkanes, alkenes, alkynes and alkyl halides. Structural determination using Mass spectroscopy and NMR using internet based research and computer applications.

### **Students with Disabilities:**

Every attempt will be made to accommodate any student with disabilities. If you have a documented or undocumented disability please see me after class as soon as possible to discuss necessary accommodations and/or contact the Office for Students with Disabilities at (718) 482-5279 or go to room M-102

### **Evaluation:**

Exams (3)	300 points
Cumulative Departmental Final	200 points
Homework (10) @ 10 pts each	100 points
Lab reports (10) @ 25 pts each	250 points
Pre-Lab Quizzes (10) @ 5 pts each	50 points
Lab Protocols (10) @ 5 pts each	50 points
Lab Exam Final	50 points
<b>Total</b>	<b>1000 points</b>

### **Grading Standards:**

A minimum of 60% out of 1000 points must be earned in order to receive a passing grade of D-

### **Grading Scheme:**

A = 93-100	A- = 90-92.9	
B+ = 87-89.9	B = 84-86.9	B- = 80-83.9
C+ = 77-79.9	C = 73-76.9	C- = 70-72.9
D+ = 67-69.9	D = 63-66.9	D- = 60-62.9
F = < 60		

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### **Academic Integrity Policy:**

Students are required to observe the College Policy regarding cheating on examinations and quizzes. A complete statement of the policy is available at the student counseling services. Academic Dishonesty is prohibited in the City University of New York and is punishable by penalties ranging from a grade of "F" on a given test, research paper or assignment, to an "F" in the course, or suspension or expulsion from the College. Please visit this website to learn more about what is classified as academic dishonesty by CUNY

(<http://library.laguardia.edu/files/pdf/academicintegritypolicy.pdf>)

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### **Attendance Policy:**

Attendance at all class sessions, lecture and laboratory, is essential for proper understanding and mastery of the course material. A student who is absent from more than one laboratory session seriously jeopardizes his/her grade for the course. The maximum number of unexcused absences is limited to 15% of the number of class hours, about 4 lectures.

### **Cell Phone Policy:**

The use of cell phones, smart phones, or other mobile communication devices is disruptive, and is therefore prohibited during class. Except in emergencies, those using such devices must leave the classroom for the remainder of the class period.

**The use of cell phones in class is prohibited.**

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### **Make-up Policy:**

There will be **no make-up exams or quizzes**. A student who has missed a test or quiz must have a doctor's note. **There will be no make-up labs.**

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### **Online Homework and Reading Assignments:**

**Online - All DIGITAL:** You can purchase Connect (no print book, but includes the complete eBook and access to all course content) directly from the course website listed below. To register and purchase Connect without the print book, follow the steps below.

**Bookstore:** Your bookstore has a package which includes the full loose-leaf version of the text and a two year Connect access code (you will need this code to access the online study modules and materials). The ISBN for this package is as follows: **9781260036909**. The bookstore also has available just a Connect access code if you would like to go all digital (includes eBook and two year access) with the following ISBN: **9781260036879**. To register for Connect, follow the steps below.

### **How to Register for Connect**

1. Go the section web address:  
**<http://connect.mheducation.com/class/scc-251-170a>**
2. Click the “**Register Now**” Button.
3. Enter your email address.
  - a. If you already have a McGraw-Hill account you will be prompted for your password.
  - b. If you do not have a McGraw-Hill account you will be asked to create one.
  
4. To access Connect:

- a. If you already have a registration code (for example, included in the print package from the bookstore), enter it in the “**Have a registration code?**” section.
  - b. If you do not have an access code, select “**Buy Online**” (valid credit card required).
  - c. If you wish to purchase at a later time, you may begin a 14-day **Courtesy Access** period at this time. You will be prompted to upgrade to full Connect access before your courtesy access period expires. You **must** purchase full Connect access in order to maintain access to your course assignments and materials
5. Complete the registration form, and click “**Submit**”

## Technical Support

If you need Technical Support (forgotten password, wrong code, etc.) please contact the McGraw-Hill Education **Customer Experience Group (CXG)** at:

(800) 331-5094

[www.mhhe.com/support](http://www.mhhe.com/support)

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## Lectures and Exam:

Carey	Topics
Chapter 1 review (student responsibility)	Structure Determines Properties Alkanes, Cycloalkanes
Chapter 2 sections 2.1 through 2.24	Intro to Hydrocarbons Alkanes, Cycloalkanes
Chapter 3 sections 3.1 through 3.12	Conformations cis/trans
Chapter 4 sections 4.1 through 4.8	Chirality

## Exam 1

Chapter 5 Sections 5.1-5.14

Alcohols Alkyl Halides  
Introduction to  
Mechanisms

Chapter 6 sections 6.1 through 6.13

Nucleophilic Substitution

Chapter 7 sections 7.1 through 7.19

Structure and Preparation  
of Alkenes; Elimination  
Reactions

## Exam 2

Chapter 8 sections 8.1 through 8.12

Addition Reactions of  
Alkenes Reactions

Chapter 9 sections 9.1 through 9.13

Alkynes

## Exam 3

Chapter 10 sections 10.1 through 10.4

Introduction to Free  
Radicals

Chapter 14 sections 14.1 through 14.12 & 14.20 through 14.23

NMR IR Spectroscopy  
Structure Determination

## Final Exam Cumulative



## Laboratory:

A complete, accurate record is an essential part of laboratory work. A lab report will be required for each lab performed. Your lab reports must be recorded in a bound laboratory notebook. The required format of the lab reports is shown in your laboratory manual. You will be expected to have all of the relevant information and create a protocol about the running of an experiment entered in your notebook before coming to laboratory so that your lab manual should not be needed when you are conducting the actual experiment. All lab reports must also be submitted through safe assign first as a draft, then as a final version. A hardcopy will be handed into the instructor.

## Lab Safety:

Please be aware where safety equipment is located (Safety Shower, Eye Wash Station, Fire Extinguishers, Fire Blankets, First Aid Kits and Emergency Exits). Students are required to wear safety glasses at ALL times for laboratory work and to observe all safety rules. In the lab there is **no smoking, no eating, no drinking, no open toe shoes or sandals and you MUST have goggles for every lab**. These rules exist for your safety and the safety of everyone in the lab. If you violate any of these rules you will be asked to leave the lab and you will receive a zero grade for that lab. No student will be allowed to perform the experiment if they arrive 30 minutes after the lab has started.

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## Lab Experiments:

Week 1	Lab Safety Procedures, Lab Reports and Reference Style
Week 2	Melting Points
Week 3	Crystallization
Week 4	Extraction of Caffeine
Week 5	Simple Distillation
Week 6	Fractional Distillation
Week 7	Thin-Layer Chromatography
Week 8	Column Chromatography
Week 9	Steam Distillation Limonene (posted on blackboard)
Week 10	Alkene from Alcohol
Week 11	Synthesis of Aspirin
Week 12	Lab Final

**There will be a 15 min quiz before each lab**