Objective
To develop an understanding of fundamental factors underlying organic reactions. At the end of the semester, students should be able to provide reasonable reaction mechanisms for many organic reactions.

Prerequisite
Because of the advanced nature of this topic, one year of organic chemistry and advanced study in organic chemistry (such as research) is necessary. If you have not had advanced courses, permission of the instructor is required; Ph.D. students in the Department of Chemistry are exempted from this pre-requisite. Any material that addresses basic organic chemistry will need to be learned on one’s own.

Textbook
We will not be using a textbook because most of the books I have examined either cover too much material or cover older, less relevant material. If you would like a reference book for use in the class and beyond (although not necessary), consider either Carey and Sundberg (my preference) or Anslyn and Dougherty. If you need a less advanced book, I recommend Grossman, although it is not a reference book, it is a how-to guide. Older editions of books are suitable, too, considering that much of the foundational material has not changed. I will also be able to give you reading suggestions in each of these books, but I think you can figure this issue out on your own. Any links listed below worked over the summer, but if they do not work now, you should use your research skills to find them. Some readings from other books will be made available to you through the “Course Reserves” tool in Classes; check it for availability.

(1) Your textbook titled “Organic Chemistry.” It does not matter which organic chemistry textbook it is. If you know this content well, you will be fine. Consult it regularly. I am partial to my colleague Maitland Jones’s textbook. Whatever book you use, read it. If you do not know the basics, more advanced material will be out of reach.


(5) Fleming, I. Frontier Orbitals and Organic Chemical Reactions, Wiley: Chichester, UK, 2010. This new edition updates a book that used to be elegant in its
simplicity. It is still an excellent book, but try not to not get bogged down in the
10.1002/9780470689493

Class Format
The University designated this course as a “blended” course based upon the anticipated
enrollment. This designation means that a student should be able to have in-person
interactions with the instructor (which would, obviously, be in real time, or, in the current
parlance, “synchronous”). A student should also be able to engage fully in the course
online if they are unable to come to the classroom or are unable to participate in a
synchronous, in-person class. The blended course type, which could represent the best
of all possible worlds, will be difficult to establish and maintain. Your patience,
understanding, and flexibility is appreciated as we all do our best during these difficult
times to combat coronavirus, anxiety, and the entropy associated with learning this
semester.

Students will need to declare their preferred option for the course on Albert, and keep
that status updated. Of the two directions, it will be more challenging to move from
“remote” to “in-person” than from “in-person” to “remote” because the number of seats in
the classroom is finite. Moving someone to “in-person” might be possible, but it would
require finding a seat in one of the cohorts, which is not assured. Again, I would
appreciate your patience as we resolve such problems.

To be a blended in-person/online class, we will conduct the class, well, both in person
and online. The course content will include:

1. **Videos.** Each week, videos will be provided that present the usual lecture content (in
this sense, the class has been “flipped”). These videos will be in the “Lessons” tool
in Classes and will be provided in one-week segments. These videos will be most
useful if at least some are studied (for the first time) before class on Tuesday, and all
by Thursday. The amount of material per 75-minute class is the same (if not maybe
a bit more) than the amount of material that I taught last year for this class. The
videos go faster because I do not need to draw structures, so there will not be 150
minutes of video content every week. There will still be 150 minutes (or more) of
course content as judged by last year’s course. These videos are composed and
recorded assuming that you are paying attention fully. You will likely need to stop
and start them multiple times and take notes on them.

2. **In-person class discussion.** These discussions will take place at the time and place
noted above. If you are not attending class that day, those discussions can be
attended online, and they will be recorded if you cannot participate synchronously or
if you wish to review any content later (recordings are automatically loaded to
Classes and can be found under the “Previous Meetings” tab in the “Zoom” tool).
During these discussions, I will answer any questions that you have, so these
sessions will function as office hours. I will also give some tips for how to solve
problems, and we will also discuss the answers to problems, if you are interested.

3. **Problems for discussion.** There will be short problem sets (usually ungraded) that
will help you learn the material through doing problems or reading outside of class
(in this sense, the course has a “problem-based learning” component). These
problems can lead to questions that can be addressed in the in-person class
discussion. At various points, I may give a short graded problem set to give you
individual feedback on your work outside of the three examinations. Please see the
“Tests and Quizzes” tool of Classes to get short quizzes that will help you study the
videos.
Learning under COVID-19 and Our Responsibilities

Considerable amounts of material have been made available to you regarding our responsibilities during this pandemic. I will not detail those here, except to wish sincerely that you and your family remain healthy. The following website will be helpful to you: https://www.nyu.edu/life/safety-health-wellness/coronavirus-information.html

Learning under these conditions will be challenging.

When the going gets tough, however, the tough get going. We can do this. We will come through this experience better and stronger. It is my intention that this blended mode of teaching, including online content, in-person discussions, and problem-based material, will be a better way to communicate this material than the standard lecture format.

To make this course “blended,” as required by the University, I must continue to come to the classroom to teach in-person (obviously). To prepare for the possibility that I will become ill, I have recorded videos a few weeks in advance. It would be better, however, that I not become ill (at least from my point of view). I must safeguard my own health so that I can continue to fulfill my responsibilities. I will be particularly conscious of social distancing. I will not be able to meet with anyone in person, nor will I be able to touch any objects (such as papers) with which anyone has had contact. I am not a distant person, as I hope that you will learn this semester and in your future years at NYU. For the moment, however, I must act to protect my health and yours.

The blended format will require us to become adept at using electronic means of communication. Zoom and Classes will be our principal modes of communication. Please familiarize yourself with these platforms, among others.

In some cases, these instructions for how to operate in class are “one size fits all.” For example, everyone is required to wear a mask in class. If you have a medical exception to this policy, however, the University has a policy to address that issue. If there are specific important issues that need to be addressed, please contact me by email to arrange them.

Masks and Other Procedures for Minimizing Spread of Covid

Everyone, myself included, will wear masks that cover our noses and mouths during class. To make sure that our masks remain on at all time, please refrain, for all of our safety, from bringing food or beverages to class. Personally, I enjoy drinking a cup of coffee while I teach. I will not do so this semester out of concern for your safety and for mine.

Please also be aware that our classroom is in a building and room that may have some traffic. You may wish to sanitize your desk and workspace when you come to class (https://www.nyu.edu/life/safety-health-wellness/coronavirus-information/campus-life/enhanced-building-cleaning.html#classrooms). I am obligated to sanitize my workspace in the classroom.

Please see this website regarding other policies that we need to use to access the buildings and the classrooms and so that we keep each other safe:

https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/building-access-policy.html
In the “Resources” section of Classes I attached a document, dated August 27, 2020, with additional information about operational issues. Please check NYU websites for any important updates. Information is likely to change.

Any issues regarding non-compliance of University rules can be reported to: covidcompliance@nyu.edu

**Cohorts**
Because the number of students enrolled and having selected the “in-person” option is much larger than the number of seats for the room, we will have students come to class as part of a cohort that meets in the classroom only at certain times. You have been assigned a cohort (listed as a Section Cohort). Because you have enrolled in this class, you do not have any other commitments for this time period, so either cohort will work for you; I allowed Classes to assign your cohort. Considering that the seats are assigned, it is not possible to move from one cohort to the other.

**Seat Assignments**
On the first class period that each cohort arrives in the room, students will choose their seat for the rest of the semester. Enter the seat number on NYU Classes in the “Seating Assignment” tool (you will be able do this task on your mobile devices.) Every available seat will be numbered. Once students enter their seat numbers, that will be their assigned seat for the rest of the semester, unless the instructor makes a change (any change would be registered through Classes). I am unlikely to make changes, so please choose wisely. Please be understanding if someone needs special arrangements such as a left-handed desk.

**Auditing the Class**
For anyone who wishes to audit the class, they would need to participate online because of the limited number of seats available. The participation and responsibilities would otherwise be identical for students taking the course as for students opting for the “Remote Instruction” option. I will need a NYU NetID to add you to the Classes website.

**Privacy and Respect**
I am sure that there are numerous legal issues related to these topics, but common sense should be useful guidance. We should consider our class as a group, and we will treat each other respectfully as fellow professionals. Because the classroom activities will be recorded, there is a possibility that the confidentiality and privacy of our meetings can be compromised beyond our own class. To ensure that privacy and professionalism, you will be required to log in using your NYU NetID to access any online materials through Classes.

I have spent considerable time and effort preparing your course materials. You should treat that material as confidential. You are not to share any of the course content with anyone who is not enrolled in this class.

**Should we Need to Switch to Remote Instruction Mid-Semester**
Little will change. Rather than have our discussions in class, they will be at the same time, on Zoom. We will still meet at the appointed time. It will just be online.

**Zoom**
You will need to be authenticated through your NYU login to access the class. The easiest way to do this would be to use this website:

https://nyu.zoom.us
Login using your NetID and two-factor authorization.

**Problem Sets and Quizzes**
There will be a few problem sets and quizzes of different types. Although discussions of problems with classmates is permitted (and can be much more effective than learning on your own), communal problem solving for credit is not. When it is a graded problem set, the solutions you turn in should be your own work. It is obvious to me when you submit someone else’s work, which detracts from the academic integrity and scholarship of what we are doing together. In my experience, if you do not work on the problem sets on your own, you will not learn the material, and you will not do well on the examinations in the class and in later examinations, such as the Ph.D. Advancement to Candidacy Examination.

There will be short Quizzes associated with the video instruction. These will be graded. They will not be difficult if you have seen the videos and read through the notes. They will only be available for a finite time to help you pace your studying, so please complete them in a timely fashion.

**Closed-Book Take-Home Exams**
The exams will be closed-book, but they will be take-home. You will have a 24-hour window in which to complete them. No resources other than molecular models and a calculator are permitted. They will be tests of what you have learned, not tests of how good you are at searching the web or how skilled you are at communicating with others.

Mid-term exams will be: Tuesday, October 6 and Tuesday, November 10
Cumulative final examination: Thursday, December 10

**Grading and Grades**
Problem Sets and Quizzes: ~10%
Midterm and Final Examinations: ~30% each
Please familiarize yourself with the grade requirements necessary to maintain good standing in the Ph.D. program.

**Schedules of Assignments**
I have done my best to minimize conflicts between assignments and religious holidays. If there are any such conflicts, please contact me; NYU’s policies will be followed (http://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-calendar-policy-on-religious-holidays.html). The best idea in all cases is to let me know as soon as possible before the date of the assignment so we can make arrangements.

**Course Content**
I. Basic Concepts of Physical Organic Chemistry
II. Molecular Orbital Theory
III. How to Propose a Mechanism
IV. Nucleophilic Substitution and Related Reactions
V. Reactions of C=C and Related Reactions
VI. Acidity and Generation of Carbanions
VII. Reactions of Carbonyl Compounds
VIII. Radicals
IX. Carbenes
X. Pericyclic Reactions
XI. Conformation Analysis