

## Syllabus

### CHEM 395-002/425-001 Special Topics in Organic Chemistry (Fall 2018) "Advanced Organic Synthesis"

#### COURSE INFORMATION

##### Course Instructor

Instructor: Prof. Hee Yeon Cho  
 Office: Flanner Hall 209  
 Email: [hcho6@luc.edu](mailto:hcho6@luc.edu)  
 Course Website: sakai.luc.edu  
 Group Website: <http://www.chogroup.org>

##### Course Schedule

Lecture: M/W 4:15–5:30 PM in Flanner Hall 105  
 Office Hours: M/W 5:40–6:40 PM in Flanner Hall 209  
 To schedule an alternative appointment, please email me.

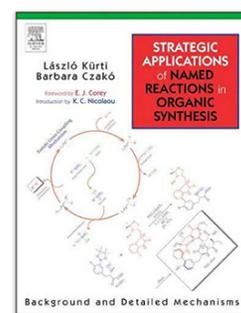
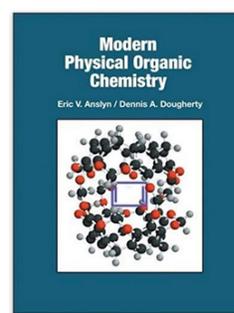
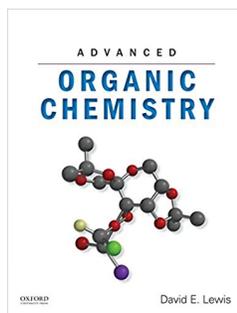
##### Prerequisite

CHEM 222 or 224 (Organic Chemistry II) with C– or better

##### Course Materials

Textbook (**REQUIRED**):

- Advanced Organic Chemistry  
 By David E. Lewis  
 ISBN-13: 978-0199758975



Textbooks (*Recommended*):

- Modern Physical Organic Chemistry  
 By Eric V. Anslyn & Dennis A. Dougherty  
 ISBN-13: 978-1891389313
- Strategic Applications of Named Reactions in Organic Synthesis  
 By Laszlo Kurti & Barbara Czako  
 ISBN-13: 978-0124297852

#### GRADING POLICY

##### Course Grade

(1)	2	Highest Homework Grades (100 points each, 200 points)	200	20%
(2)	2	Highest Midterm Exams (200 points each, 400 points)	400	40%
(3)	1	Final Exam (300 points)	300	30%
(3)		Attendance (100 points)	100	10%
<b>Total</b>			<b>1000</b>	<b>100%</b>

##### (1) Homework Problem Sets (200 points, 20%)

There are **three (3)** homework problem sets given during the semester. Among three, the best two homework grades will be counted, and the lowest grade will be dropped. Each problem set will be worth 100 points. *Paper copies* of all assignments are to be turned in at the beginning of class (4:15 pm) of the due dates. No electronic copies will be accepted. Late submissions will be accepted up to 24 hours after the due at a deduction of 50 points.

**(2) Midterm Exams (400 points, 40%)**

There are **three (3)** midterm exams on 10/1/18, 11/5/18, and 12/5/18. Among three, the best two grades will be counted, and the lowest grade will be dropped. The midterm exams cover lecture topics and will be held during the lecture. There are **NO MAKEUP midterm exams**.

**(3) Final Exam (300 points, 30%)**

The final exam will take place on **Monday, December 10 at 4:15–6:15 PM in Flanner Hall 105**. *The final exam is cumulative*. All topics discussed during lecture over the semester will be on the final. There is **NO MAKEUP final exam**.

**(4) Attendance (100 points, 10%)**

Any absence that is not approved by Dr. Cho will result in a deduction of 50 points. Tardiness will result in a deduction of some attendance points (10–40 points).

**Final Grades**

A guideline for grades is shown below. At minimum, you will receive the grade indicated. However, if the class average is below 75% at the end of the semester (*i.e.* the class average of total point is below 750), there will be a modified grading system. Each exam will not be curved.

A = 94.0–100%	C+ = 75.0–77.9%
A– = 89.0–93.9%	C = 66.0–74.9%
B+ = 86.0–88.9%	C– = 63.0–65.9%
B = 81.0–85.9%	D = 51.0–62.9%
B– = 78.0–80.9%	F = 0–50.9%

**Lecture and Homework**

The class lectures will be the *most critical source* of information for this course. If you miss a lecture, please find notes from another student in class. The homework problems will reiterate important points made during the lectures and will be similar to exam questions.

**Class Etiquette**

Come to class on time; No talking; No electronic devices, but you can use your laptop or tablet for note taking. Students with multiple violations of classroom etiquette will be subject to point deductions throughout the semester (Attendance points). Email messages and other electronic communication among students in the course should be respectful, appropriate, and professional. Only emails from your Loyola account will be accepted, and the instructor will only send emails to your Loyola University account.

**COURSE DESCRIPTIONS & OBJECTIVES****Course Topics**

- I. Fundamentals Revisited: Structure, Bonding and Reactivity, Stereochemistry (Chapters 1–2)
- II. Orbitals & Reactivity, Frontier Orbitals & Chemical Reactions (Chapters 4–5)
- III. Pericyclic Reactions and the Conservation of Orbital Symmetry (Chapter 6)
- IV. Aromaticity: The 150-Year Riddle (Chapter 7)
- V. Physical Organic Chemistry and Reaction Mechanisms (Chapter 8)
- VI. Carbocations & Synthesis Using Carbocations to Form C–C Bonds (Chapters 9–10)
- VII. Carbanions & Synthetic Reactions of Carbon Nucleophiles: Substitution and Addition (Chapters 11–12)
- VIII. Free Radicals, Carbenes, Arynes, and Nitrenes (Chapter 13)
- IX. Applications of Free Radical Chemistry in Synthesis (Chapter 14)
- X. Retrosynthetic Analysis, Protecting Groups, and the Strategy of Organic Synthesis (Chapter 15)
- XI. Condensations and Cascade Reactions of Carbon Nucleophiles (Chapter 16)
- XII. Oxidation Reactions (Chapter 18)
- XIII. Reduction with Molecular Hydrogen or with Complex Metal Hydrides (Chapters 19–20)
- XIV. Asymmetric Oxidation and Reduction (Chapter 21)

## Course Description and Outcomes

The main objective of this course is to build a fundamental understanding of organic reactions and reaction mechanisms. The types of reactive intermediates that will be reviewed in this course include carbocations, carbanions, and free radicals. This course will provide a fundamental knowledge of how structure affects the reactivity of organic molecules. This foundation of knowledge will allow students to attack new problems that they are faced with as they progress as scientists. This will be achieved by taking an in-depth mechanistic analysis of several synthetic processes.

## COURSE POLICY

### Academic Integrity

All students in this course are expected to have read and to abide by the demanding standard of personal honesty, drafted by the College of Arts & Sciences. Anything that you submit as part of your grade in this course (homework, exam, etc.) must represent your own work. Any students caught cheating will, at the very minimum, receive a grade of "zero" for the item that was submitted. If the cheating occurred during a course exam, the incident will be reported to the Chemistry Department Chair and the Office of the CAS Dean. Depending on the seriousness of the incident, additional sanctions may be imposed.

### Dropping and Withdrawal

September 4: Last day to withdraw without a "W" grade

November 2: Last day to withdraw with a "W" grade, thereafter a "WF" will be assigned

### Course Repeat Rule

Effective with Fall 2017, students are allowed only *three* attempts to pass Chemistry courses with a C- or better grade. The three attempts include withdrawals (W). After the second attempt, the student must secure approval for a third attempt. Students must come to the Chemistry Department, fill out a permission to register form or print it from the Chemistry Department website: <http://www.luc.edu/chemistry/forms/> and obtain a signature from the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. Then, a copy of this form is taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

### Disabilities

Students with a university-documented disability should contact me *immediately*. If your disability requires that quizzes and exams be taken outside of the scheduled time or place, please consult: [www.luc.edu/sswd/](http://www.luc.edu/sswd/). Services for Students with Disabilities (SSWD) serves students with disabilities by creating and fostering an accessible learning environment. To accommodate your special requests, I need to receive *an official letter* from the SSWD center at least *a week before* the exam date.

### Loyola University Absence Policy for Students in Co-Curricular Activities:

Students missing classes while representing Loyola University Chicago in an official capacity (e.g. intercollegiate athletics, debate team, model government organization) shall be allowed by the faculty member of record to make up any assignments and to receive notes or other written information distributed in the missed classes. Students should discuss with faculty the potential consequences of missing lectures and the ways in which they can be remedied. Students must provide their instructors with proper documentation (develop standard form on web) describing the reason for and date of the absence. This documentation must be signed by an appropriate faculty or staff member, and it must be provided as far in advance of the absence as possible. It is the responsibility of the student to make up any assignments. If the student misses an examination, the instructor is required to give the student the opportunity to take the examination at another time.

### Course/Instructor Evaluation – IDEA

At the end of the semester, you will complete an online evaluation of this course based on criteria set by IDEA and by the instructor. For this course, the main objectives are as follows:

- 1) Gaining factual knowledge (terminology, classifications, methods, trends)
- 2) Learning fundamental principles, generalizations, or theories
- 3) Gaining a broader understanding and appreciation of intellectual/cultural activity

**FALL 2018, CHEM 395/425 Calendar**

\*\*\* NO MAKE-UP EXAMS (midterm or final) will be given. Plan accordingly.

Week	Monday	Tuesday	Wednesday	Thursday	Friday
1	8/27 <b>Lecture 1</b>	8/28	8/29 <b>Lecture 2</b>	8/30	8/31
2	9/3 Labor Day	9/4 Last day to drop without "W"	9/5 <b>Lecture 3</b>	9/6	9/7
3	9/10 <b>Lecture 4</b>	9/11	9/12 <b>Lecture 5</b>	9/13	9/14
4	9/17 <b>Lecture 6</b>	9/18	9/19 <b>Lecture 7</b>	9/20	9/21
5	9/24 <b>Lecture 8</b>	9/25	9/26 <b>Lecture 9</b>	9/27	9/28
6	10/1 <b>MIDTERM 1</b>	10/2	10/3 <b>Lecture 10</b>	10/4	10/5
7	10/8 Fall Break	10/9 Fall Break	10/10 <b>Lecture 11</b>	10/11	10/12
8	10/15 <b>Lecture 12</b>	10/16	10/17 <b>Lecture 13</b>	10/18	10/19
9	10/22 <b>Lecture 14</b>	10/23	10/24 <b>Lecture 15</b>	10/25	10/26
10	10/29 <b>Lecture 16</b>	10/30	10/31 <b>Lecture 17</b>	11/1	11/2 Last day to drop without "WF"
11	11/5 <b>MIDTERM 2</b>	11/6	11/7 <b>Lecture 18</b>	11/8	11/9
12	11/12 <b>Lecture 19</b>	11/13	11/14 <b>Lecture 20</b>	11/15	11/16
13	11/19 <b>Lecture 21</b>	11/20	11/21 Thanksgiving	11/22 Thanksgiving	11/23 Thanksgiving
14	11/26 <b>Lecture 22</b>	11/27	11/28 <b>Lecture 23</b>	11/29	11/30
15	12/3 <b>Lecture 24</b>	12/4	12/5 <b>MIDTERM 3</b>	12/6	12/7 Last Day of Classes!
16	12/10 <b>4:15-6:15 PM FINAL EXAM</b>	12/11	12/12	12/13	12/14

**CHANGES TO SYLLABUS**

There may be changes to the syllabus during the semester. ***You are responsible for all syllabus changes made in class whether or not you attend.***