

SYLLABUS – CHEM 223 – Organic Chemistry A – 1st Semester – TuThur Lecture
Fall 2016 - LOYOLA UNIVERSITY CHICAGO (LUC)

Lecture: #5254 **Section:** 015 **Tues+Thur 8:30 am – 9:45 am Flanner – Auditorium 133**

Discussion: #5255 **Section:** 016 **Thur 10:00 - 10:50 am Flanner 105**
#5256 **Section:** 017 **Thur 1:00 - 1:50 pm Flanner 105**
#6341 **Section:** 021 *****Fri*** **8:15 – 9:05 am** ***Cuneo 002*****

Senior Lecturer: Dr. C. Szpunar

Office: Flanner Hall **200B**

Contact: best in person, 773-508-3128, cszpuna@luc.edu

Emergency Message via Chemistry Dept. Office, 773-508-3100, fax: 773-508-3086

Office Hours: **Mon** and **Fri:** 12:00 noon-2 p.m., **Tues:** 10 a.m.- noon *** and as arranged **prior**

N.B.: Answer keys will be posted in the glass case outside Flanner 200B. No photographing pls!

Required:

1. Organic Chemistry, Wade 8th ed. (**red**), Prentice Hall, 2013 (ISBN 978-0-321-76841-4) *or* Wade, 7th ed. (**navy blue**), Prentice Hall, 2010 (ISBN 978-0-321-59231-6) *or* 6th ed. (**black**), Prentice Hall, 2003 (ISBN 0-13-147871-0) *or* 5th ed. (white) *or* equivalent
*****NO ACCESS CODE NEEDED, NOR DESIRED, NOR SUGGESTED*****
2. Study Guide and Solutions Manual, Wade & Simek, 8th ed. (ISBN 978-0-321-77389-0) *or* 7th ed. (ISBN 978-0-321-59871-4) *or* 6th ed. (ISBN 0-13-147882-6) *or* 5th ed., as appropriate to accompany text

Suggested / Recommended Materials:

1. Molecular modeling kit, Darling, Prentice-Hall, Freeman (Maruzen), Proteus, or equivalent
2. Spiral or bound notebook for homework problems

Optional Materials (found helpful by some students, but hold off initially – do not purchase immediately):

1. Organic Chemistry as a Second Language, I, Klein (2017), Wiley (ISBN 978-0-119-11066-8)
2. Barron's Orgo Cards: Organic Chemistry Review, Wang, Razani, Lee, Wu, and Berkowitz (ISBN 0-7641-7503-3)
3. Organic Chemistry: A Short Course, Hart, Craine, Hart, and Hadad (12th edition, 2007), w/CD-ROM, Houghton Mifflin (ISBN-10: 0-618-59073-0, ISBN-13: 978-0-618-59073-5) (*Please see lecturer BEFORE purchasing - only for students who may require an alternative-study approach.*)

Grading (weighting below) with approximate curved grade guidelines: > 90% A; 75-90% B; 55-75% C

EXAMS – 3 – dates scheduled, announced (subject to change, although unlikely) **NO MAKE UPS 45%**
(subject to change, although unlikely, 50-minute exam)

- UNEXCUSED ABSENCES merit a zero score.
- EXCUSED ABSENCES are handled on a case-by-case basis; grade weighting may be adjusted, depending on the circumstance(s); however, an excused absence **MUST BE CORROBORATED and DOCUMENTED**, e.g., accompanied by a note from the doctor, dentist, hospital rep, or funeral director; by a court summons, plane ticket stub, hospital release form, obituary, or other. With proper documentation, religious observance, representing the university, or personal emergency constitutes an Excused Absence.

QUIZZES – TBD – **unannounced** (during lecture or discussion or as take-home, **NO MAKE UPS**) **15%**

HOMEWORK - assigned per topic / chapter, see Suggested Homework Assignment, below **5%**

FINAL EXAM – date scheduled and announced (scheduled by CAS) **35%**

*** Please note that because this course, *Organic Chemistry*, is cumulative, comprehensive, and improvement-based, and because the final exam is deemed a culminating measure of a student's progress, any student meriting an F on the final exam may achieve a recorded course grade no higher than D, despite total points; a final-exam score of D may merit a course grade no higher than C, despite total points; and a final-exam score of C may merit a course grade no higher than B, despite student's standing otherwise (i.e., despite total points.)

Course Objective: To guide, encourage, and foster the learning and understanding of Organic Chemistry – nomenclature, structures, properties, mechanisms, and syntheses – by the individual student, helping him/her to connect, extrapolate, integrate, and apply the many different aspects learned.

Student Outcomes: If successful, the student will learn how to ...

1. identify the various classes of organic compounds, their methods of preparation, and typical reactions.
2. name and draw specific organic compounds.
3. postulate a logical reaction mechanism for simple organic reactions.
4. discriminate amongst relative stabilities of reaction intermediates.
5. plan and write out multi-step syntheses using known reagents / conditions to transform functional groups.
6. prepare for basic purification/separation techniques of organic compounds required in the laboratory.
7. analyze and interpret data from various instruments used in separating and identifying organic compounds: IR, NMR, and UV-vis spectrophotometers and mass spectrograph.

Lecture and Discussion – Attendance and Attention: Important and required. Feel free to bring your books and modeling kit to class. Better yet, use them. Prepare for lecture by prior scanning of new material. Come prepared for discussion; be ready to ask questions on assigned homework or yet-unassimilated lecture material. **Please note that materials from this course cannot be shared outside the course without the instructor's written permission (as reminded by the CAS Dean's Office memo, Jan. 8. 2016).**

Cell Phones: NONE. Please be courteous and respectful of others. Silent mode during lecture and discussion. **Not allowed in sight or within hearing during exams, subject to confiscation.** NO phone conversations in lecture hall or in discussion class – before class, during class, after class – AT ANY TIME! No texting – before class, during class, after class – AT ANY TIME! If you must talk or text, take it outside!!!

Photography: NONE. No photography of posted quiz or exam keys. No photography of discussion or lecture blackboard or whiteboard content.

Recording: NONE. No recording of lectures.

Academic Honesty: Essential, expected, and enforced. Dishonesty dictates consequences which may include: (1) notification of Chemistry Department Chair, student's Department Chair, and CAS Dean, (2) documentation in the student's official university record, and (3) dismissal from the university. Immediate consequences will include a **ZERO** on any item in question (quiz or exam). Please refer to the LUC Undergraduate Handbook on policies or the CAS website: http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml.

Study Strategies and Suggestions: One may approach the study of Organic Chemistry in a manner similar to tackling a new foreign language. Its study will provide a basis to understanding future material – *building constantly, incessantly, and relentlessly* on the structural and mechanistic information presented previously and, hopefully, acquired by the student. Over two semesters, the course will cover: bonding, functional groups, families of aliphatic and aromatic compounds, nomenclature, structures, stereochemistry, reaction mechanisms, multi-step syntheses, and spectroscopic techniques. Because the course is cumulative and builds heavily on prior material, the best plan is to study Organic Chemistry regularly, every day, similar to practicing the piano. Collaboration on homework problems is encouraged, especially in a timely fashion. Experience dictates that positive outcomes (for exam and course grades) are directly proportional to working and understanding the assigned problems on a regular basis, i.e., applying the concepts learned to non-generic situations.

Typically, Organic Chemistry is not efficiently self-taught. Overnight cramming will probably not produce success! The student should quickly read the chapter/segment to be covered BEFORE lecture to improve lecture comprehension. After lecture, careful detailed re-reading of the chapter/segment and focused working of the assigned problems are appropriate, necessary, essential, and expected. In addition to student's participation in lecture, discussion, reading, and homework, joining and contributing to a study group is strongly encouraged.

If anticipating a passing grade of C, the minimal time per week devoted to Organic Chemistry is estimated at 4 hr for lecture and discussion, 4-10 hr for reading, and 4-10 hr for homework.

Chemistry and Biochemistry Department Caution (*effective Aug. 4, 2016*):

A student who opts to withdraw from CHEM 223 lecture after midterm may be permitted to remain in CHEM 225 – the co-required laboratory, **ONLY** if his/her midterm grade, as posted in LOCUS, is a D or better. If a student plans to continue with the laboratory portion of the sequence, that student must continue to attend all of the lectures until the week of the official drop date, to gain as much background knowledge as possible in preparation for each laboratory assignment and in order to work safely in the laboratory amongst the other students. If a student is considering withdrawing from lecture, but remaining in the lab, the student may seek assistance from the Department of Chemistry and Biochemistry Office in the week prior to the deadline for withdrawing, beginning Monday at 9:00 am through Friday at 4:00 pm. **However, students with a midterm grade of F are required to drop the co-required laboratory along with the lecture without exception.**

Homework Package: *** due Tuesday, Nov. 15, 2016 by noon ***

Hand in at least 15 completed problems (or parts of multiple problems) per chapter, **Chapters 1–10**. (Underlined problems may be particularly insightful or anticipatory.) If not using a notebook, include your name and the date worked on **each** page. **Clearly mark the chapter** and problem number for full credit. Be sure to **staple/clip** packets in chapter order ****and/or**** **flag each individual chapter in packet/notebook** (to be returned to the student). **Deliver at lecture or to Flanner 200B**, directly to the lecturer, NOT to the dept. office!!!

Suggested Homework Assignment (for Wade's 8th edition):

- Chap 1: 2-4, 6-10, 14-15, 17-18, 21, 23, 25, 27, 29, 31-32, 34-36, 39-40, 42-45, 52, 55
- Chap 2: 3-5, 7-11, 15-22, 35-36, 39-42, 44 (note solutions manual p.40 – functionality)
- Chap 3: 1-8, 10, 14-17, 20-21, 24-25, 29-30, 32-35, 37, 39, 44, 46
- Chap 4: 1-2, 4, 7, 9-13, 18-21, 28-32, 35-39, 40, 42, 45-46
- Chap 5: 1-7, 14-22, 25-31
- Chap 6: 1-3, 5-7, 9-12, 14-20, 22-26, 27 (b-e), 29-45, 53, 56
- Chap 7: 1-2, 4-8, 11-13, 15-16, 19, 21-25, 30-36, 38, 40-46
- Chap 8: 1-2, 4-19, 21-22, 26-29, 32-37, 45-47, 49, 50, 63
(N.B. solutions manual p.178 – addition + stereochemistry)
- Chap 9: 1-2, 5-13, 18-20, 23-30, 32-37
- Chap 10: 1-4, 7-10, 13-21, 23-26, 30-33, 37-41, 43, 49, 51
- Chap 11: 1-2, 4-6, 9-13, 21-22, 26, 28-31, 37, 39-44, 46
- Chap 12: 2-7, 11-12, 14-16, (17-fragmnt), 24-25
- Chap 13: 2-11, 13-15, 22-25, 27, 32-36, 38-40, 42-44, 47-48
- Chap 14: 4, 6, 8-10, 12, 14-15, (18 - mustard gas, bleach), 20, 22, 25, 27-33, (34), 39

(for Wade's 7th edition):

- Chap 1: 2-4, 6-10, 14-15, 17-18, 20-21, 23, 25, 27, 29, 31-32, 34-36, 39-40, 42-45, 54
- Chap 2: 3-5, 7-11, 15-23, 35-36, 39-42, 44 (note solutions manual p.38 – functionality)
- Chap 3: 1-5, 9-10, 14-17, 20-21, 24-25, 29-30, 32-35, 37, 39, 44, 46
- Chap 4: 1-2, 4, 7-13, 18-22, 26, 28-31, 34-39, 42, 45-46, 50
- Chap 5: 1-7, 15-22, 25-31
- Chap 6: 1-3, 5-7, 9-12, 14-16, 19-20, 22-24, 30-38, 40-45, 53, 56
- Chap 7: 1-2, 4-8, 11, 13, 15, 19, 21, 23-25, 30-36, 38, 40-46
- Chap 8: 1-2, 4-15, 17-19, 21-22, 27-29, 32, 34-37, 46-47, 49, 63-64
(N.B. solutions manual p.168 – addition + stereochemistry)
- Chap 9: 1-2, 5-8, 12, 18-19, 23-29, 33-34, 36-37
- Chap 10: 1-4, 7-10, 13-20, 23-26, 30-33, 37-39, 49, 51
- Chap 11: 1-2, 5-6, 9-13, 21-22, 26, 31, 34, 39-45
- Chap 12: 2-7, 11-12, 14-16, (17-fragmnt), 24-25
- Chap 13: 2-11, 14-15, 22-25, 32-36, 38-44
- Chap 14: TBD by student

(for Wade 6th edition):

- Chap 1: 2-4, 7-11, 13-15, 17-18, 20, 23, 25, 27, 29, 32, 34-36, 39-40, 42, 44-45, 47
- Chap 2: 5, 7-11, 15-23, 35-36, 39-42, 44
- Chap 3: 1-5, 9-10, 14-15, 20-21, 29-35, 37, 39, 44, 46
- Chap 4: 1-2, 4-13, 18-22, 26, 28-31, 34-39, 42, 45-46, 50
- Chap 5: 1-3, 5-8, 16-22, 25-30
- Chap 6: 1-7, 11-12, 14-16, 19-20, 22-24, 31-37, 44-45, 53, 56
- Chap 7: 1-2, 4-5, 7-8, 13, 15, 19, 21, 23, 25, 34-35, 38, 40, 42-45
- Chap 8: 1-2, 4-6, 8-15, 17-19, 27-28, 32, 34-37, 47, 49, 63-64
- Chap 9: 1, 2, 5-8, 12, 18-19, 23-24, 33-34
- Chap 10: 3, 7, 8-10, 13-15, 17-20, 24-26, 37-39, 49
- Chap 11: 2, 5-6, 9-11, 13, 22, 31, 34, 41-45
- Chap 12: 2-12, 14-19, 23, 25
- Chap 13: 2-36, 38-45
- Chap 14: TBD

Lecture Outline (tentative, subject to change) – Fall 2016

<u>Week</u>	<u>Date</u>	<u>Chapter</u>	<u>Topic</u>	***EVENT***
1	Aug 30 <u>Sept 1</u>	1-1 1-2 / 2-1	Intro: Lewis structures, bonding, resonance, acid-base, nomenclature Structure and properties	
2	Sept 5 6 <u>8</u>	*** 2-2 3-1	Alkanes, cycloalkanes, bicyclics	*** MONDAY ***** LABOR DAY – HOLIDAY
3	Sept 13 <u>15</u>	3-2 4-1	Chemical rxns - free radical halogenation, kinetics, intermediates ...	
4	Sept 20 <u>Sept 22</u>	4-2 5-1	Stereochemistry – chirality, isomers ...	
5	Sept 27 <u>Sept 29</u>	5-2		*** TUESDAY *** EXAM I (Chapters 1-4)
6	Oct 4 <u>Oct 6</u>	6-1 6-2	Alkyl halides, nucleophilic substitution and elimination	
7	Oct 10/11 <u>13</u>	*** 6-3 / 7-1	... Alkenes	*** Mon/Tues ***** MIDTERM BREAK ***
8	Oct 18 <u>20</u>	7-2 7-3 / 8-1	... Alkenes - rxns	
9	Oct 25 <u>27</u>	8-2		*** TUESDAY *** EXAM II (Chapters 5-7)
10	Nov 1 3 <u>4</u>	9-1 9-2 ***	Alkynes	***** FRIDAY *** (last day to withdraw with a W) *****
11	Nov 8 <u>10</u>	10-1 10-2	Alcohols	
12	Nov 15 <u>17</u>	11-1 11-2	Alcohols – rxns	*** TUESDAY *** HW assignment due ***
13	Nov 22 <u>23-25</u>	***		*** TUESDAY *** EXAM III (Chapters 8-11) *** WED-FRIDAY *** THANKSGIVING DAY – HOLIDAY ***
14	Nov 29 <u>Dec 1</u>	12-1 12-2/13-1	Spectroscopy – IR and MS ... Spectroscopy – NMR	
15	Dec 6 <u>8</u>	13-2 14-1	Ethers, epoxides, sulfides (student to finish on his/her own, if time does not permit lecture coverage)	
16	Dec 17 Sat		Cumulative FINAL EXAM, 9:00 – 11:00 am, Flanner Auditorium	