

## SYLLABUS

### CHEM 223 – Organic Chemistry A – 1<sup>st</sup> Semester (off-semester course) Spring 2010 - LOYOLA UNIVERSITY CHICAGO (LUC)

**Lecture:** #9127      **Section:** 001    **Mon+Wed+Fri**      **10:25 a.m. – 11:15 a.m.**      **Flanner 105**

**Discussion:** #9130      **Section:** 002    Tuesday      1:00 p.m. – 2:00 p.m.      Flanner 007

#9131      **Section:** 003    Thursday      1:00 p.m. – 2:00 a.m.      Flanner 007

**Sr. Lecturer:** Dr. C. Szpunar

Office: Flanner Hall 213

Emergency Message:

Student Office Hours:

Contact: in person (preferred), 773-508-3128, cszpuna@luc.edu

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

M: 11:35-1:30, Tu: 11:35-12:30, W and F: 11:35-12:15

also \*\* by **prior** appt \*\*

**Required:** Organic Chemistry, Wade, 7<sup>th</sup> ed., Prentice Hall, 2009 (ISBN xxxxxxxx)

\*or\* Wade, 6<sup>th</sup> ed., Prentice Hall, 2003 (ISBN 0-13-147871-0)

#### Suggested / Recommended Materials:

1. Study Guide and Solutions Manual, Wade & Simek, 7<sup>th</sup> ed. (ISBN xxxx) \*or\* 6th ed. (ISBN 0-13-147882-6)
2. Molecular modeling kit, Darling, Prentice-Hall, Freeman (Maruzen), Proteus, or equivalent
3. Spiral or bound notebook for homework problems

#### Optional Materials (found helpful by some students):

1. Organic Chemistry as a Second Language, I, Klein (2nd edition, 2008), Wiley (ISBN 978-0-470-12929-6) \*or\* Organic Chemistry as a Second Language, I, Klein (1st edition), Wiley (ISBN 0-471-27235-3).
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)

(Pls see instructor before purchasing, only for students who may require an alternative study approach.)

**Grading** (approx weight below) with grade guidelines: > 90% A; 75-90% B; 55-75% C; grading may be curved

**EXAMS** – 3 – dates scheduled and announced (subject to change, although unlikely) – **NO MAKE UPS 40%**

- 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, obit, 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**)      **20%**

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

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

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

**Student Outcomes:** The successful 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 functional group transformations.
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, ready to ask questions on assigned homework or yet unassimilated lecture material.

**Phones and Pagers:** 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!

**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://ww.luc.edu/cas/pdfs/CAS\\_Academic\\_Integrity\\_Statement\\_December\\_07.pdf](http://ww.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf).

**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. Over two semesters, the course will cover functional groups, aliphatic and aromatic compounds, bonding, nomenclature, stereochemistry, conformational analysis, reaction mechanisms, multi-step syntheses, and spectroscopy. 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 compounds.

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, and expected. In addition to student's participation in lecture, discussion, reading, and homework, joining and contributing to a study group is 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.*

**Suggested Homework Assignment (for Wade's 7<sup>th</sup> 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
- Chap 3: 1-5, 9-10, 14-17, 20-21, 24-25, 29-30, 32-35, 37, 39, 44, 46
- Chap 4: 1-2, 4-13, 18-22, 26, 28-31, 34-39, 42, 45-46, 50
- Chap 5: 1-7, 15-22, 25-31
- Chap 6: 1-7, 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
- 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, 14-17, 23, 25
- Chap 13: 2-11, 14-15, 22-25, 32-36, 38-44
- Chap 14: TBD by student

**Homework Package:**

\*\*\* due Thursday, **April 9**, 2009 by 12 noon \*\*\*

Hand in at least 10 completed problems (or parts of multiple problems) per chapter, Chapters 1–10. (Underlined problems are particularly insightful or anticipatory.) If not using a notebook, include your name and the date worked on **each** page. Mark the chapter and problem number for full credit. For ease in grading, staple package in chapter order \*\*\*or\*\*\* **flag chapters in homework notebook** (which will be returned to the student), as applicable.

(for Wade 6<sup>th</sup> 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 by student

**Lecture Outline** (tentative, subject to change)

<u>Week</u>	<u>Date</u>	<u>Chapter</u>	<u>Topic</u>	<b>***EVENT***</b>
1	Jan 18 20 <u>22</u>	*** 1-1 1-2	***** <i>Martin Luther King Holiday</i> ***** <i>no class</i> ***** Intro: Lewis structures, bonding, resonance, acid-base, nomenclature ...	
2	Jan 25 27 <u>29</u>	2-1 2-2 3-1	Structure and properties Alkanes, cycloalkanes, bicyclics	
3	Feb 1 3 <u>5</u>	3-2 4-1 4-2	Chemical rxns - free radical halogenation, kinetics, intermediates ...	
4	Feb 8 10 <u>Feb 12</u>	4-3 5-1 ***	Stereochemistry – chirality, isomers ... ***** <b>FRIDAY</b> ***** <b>EXAM I (Chapters 1-4)</b>	
5	Feb 15 17 <u>19</u>	5-2 5-3 6-1	Alkyl halides, nucleophilic substitution and elimination	
6	Feb 22 24 <u>26</u>	6-2 6-3 6-4		
7	Mar 1 3 <u>5</u>	7-1 7-2 7-3	Alkenes	
8	<u>Mar 8-13</u>	***	***** <b>SPRING BREAK</b> *****	
9	Mar 15 17 <u>Mar 19</u>	8-1 8-2 ***	Alkenes - rxns ***** <b>FRIDAY</b> ***** <b>EXAM II (Chapters 5-7)</b>	
10	Mar 22 24 <u>26</u>	8-3 9-1 9-2	Alkynes	
11	Mar 29 31 <u>Apr 1-5</u>	9-3 10-1 ***	***** <i>last day to withdraw</i> ***** Alcohols ***** <i>p.m. Holy Thursday through Easter Monday</i> *****	
12	Apr 7 <u>9</u>	10-2 10-3	***** <b>THURSDAY</b> ***** <b>HW assignment due for grade</b>	
13	Apr 12 14 <u>Apr 16</u>	11-1 11-2 ***	Alcohols – rxns ***** <b>FRIDAY</b> ***** <b>EXAM III (Chapters 8-10)</b>	
14	Apr 19 21 <u>23</u>	12-1 12-2 13-1	Spectroscopy – IR and MS Spectroscopy – NMR	
15	Apr 26 28 <u>30</u>	13-2 13-3 14-1	Ethers, epoxides, sulfides	
16	<b>May 3</b>	<b>Mon</b>	***** <b>Cumulative FINAL EXAM, 9-11 am, F-105</b> *****	