

SYLLABUS
CHEM 224 – Organic Chemistry B – 2nd semester
 Spring 2009 - LOYOLA UNIVERSITY CHICAGO (LUC)

Lecture:	#1369 Section 007	M+W+F	10:25 a.m. – 11:15 a.m.	Flanner Hall 133
Discussion:	#1370 Section 008	M	12:35 p.m. – 1:25 p.m.	Damen 236 (may chng)
	#1371 Section 009	M	1:40 p.m. – 2:30 p.m.	Dumbach 227 (ditto)

Sr. Lecturer: Dr. C. Szpunar
 Office: Flanner Hall 213 Contact: 773-508-3128, cszpuna@luc.edu
 Emergency Message: Chemistry Dept. Office, 773-508-3100, fax: 773-508-3086
 Student Office Hours: **Tues:** 11:30-12:15, **Wed and Fri:** 11:30-1:15, + by **prior** appt

Required: Organic Chemistry, Wade, L.G., Jr., 6th ed., Prentice Hall, 2003 (ISBN 0-13-147871-0).

Suggested Materials:

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

Optional: Barron's Orgo Cards: Organic Chemistry Review, Steven Q. Wang, Babak Razani, Edward J.K. Lee, Jennifer Wu, and William Berkowitz (ISBN 0-7641-7503-3).

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

EXAMS – 2 – dates 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; or by a plane ticket.

QUIZZES – TBD – UNANNOUNCED (during lecture or discussion period or as take-home) **15%**

FINAL – date announced (scheduled by CAS), **no alternative date/time, NO MAKE UPS 45%**

Homework - assigned per chapter/topic, feel free to work any/all problems to apply and master concepts.
Optional Short Report (*as detailed below, one option ONLY*) *** **BONUS** (*maximum of 3 - 5%*)

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: 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 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.

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 or segment to be covered BEFORE lecture to improve lecture comprehension. After lecture, careful detailed re-reading of the chapter or segment and focused working of the assigned problems are expected. *If anticipating a passing grade of C, the minimal time per week devoted to Organic Chemistry is estimated at 4 hr for lecture/discussion, 3-6 hr for reading, and 3-6 hr for homework.*

Suggested Homework Assignment:

- Chap 15: 1, 4-18, 22-27, 30
- Chap 16: 3-4, 7-8, 9 (a,b), 12-29, 32, 38-39, 45
- Chap 17: 1-2, 4-22, 24-27, 30-32, 38, 40-52
- Chap 18: 1-4, 6-12, 16-31, 34-40, 43-44, 47, 49, 51
- Chap 19: 1-21, 25-32, 34-42, 44, 47, 56, 58
- Chap 20: 1-33, 35-40, 45, 47, 50
- Chap 21: 1-39, 43-48, 50-54, 66
- Chap 22: 1-47, 59-65, 67-69
- Chap 23: 1-14, 16-17, 21-22, 24-26, 28-31, 32 (a), 33-36, 40, 41 (a,b), 52-55, 63
- Chap 24: 3-6, 20, 32, 33
- Chap 25: 1, 4, 8-9, 11-15, 32
- Chap 26: 21-29

Optional BONUS Report

CHEM 224, Spring 2009, Dr. Szpunar

***BE SURE to include on the cover sheet or top right of pg #1:

- your name
- the date
- CHEM 224 – MWF
- lecturer's name

Option 1 (max of 3%):

Visit the *International Museum of Surgical Science* and write a 1-2 pp. report (of 12-pt type, 1-in margins, double-spaced, and stapled) highlighting at least 2 of its exhibits. Attach a pamphlet from the museum on one of its exhibits.

You may wish to check to see if the # 151 Sheridan Bus (or equivalent) is more efficient than the CTA el; the bus may drop you closer to the museum, located just south of North Avenue Beach near the Polish Consulate on inner Lake Shore Drive.

1524 N. Lake Shore Drive
Chicago, IL 60610 USA
312.642.6502, fax 312.642.9516, info@imss.org
HOURS: May - September: Tuesday through Sunday 10 am – 4 pm
October - April: Tuesday through Saturday 10 am – 4 pm
ADMISSION: Adults \$6, Students & Seniors \$3
(Be sure to check the website for the current fee and free day!)

Option 2 (max of 5%):

Choose a **drug or health care product** with organic functionalities featured in any of the following articles, or a similar publication:

- Chemical & Engineering News (C&E News)*, June 20, 2005, whole issue – “Top Pharmaceuticals, from aspirin to Viagra and more,” approx. 50 pharmaceuticals.
- C&E News*, Sept. 25, 2006, cover story – “Addiction ... smoking, drug, and alcohol abuse,” pp. 21-44.
- C&E News*, Oct. 30, 2006, cover story – “Biotechs ...,” pp. 14-20.
- C&E News*, Nov. 13, 2006, cover story – “RNA ...,” pp. 16-23.
- C&E News*, Oct. 2, 2006, cover story – “Mass Spectrometry ... proteins ...,” pp. 17-25.
- C&E News*, Oct. 23, 2006, cover story – “Bacterial Banter ...,” pp. 17-26.
- C&E News*, Dec. 4, 2006, cover story – “Pharm Year in Review,” pp. 17-28.

Write a 2-5 pp. report (of 12-pt type, 1-in margins, double-spaced, stapled, and including at least 3 pertinent references or citations at the end of the report). Include the following:

- Explain why the drug or health care product is of importance or interest to you.
- Identify all the functional groups from an organic perspective.**
- Propose how you might verify the various functionalities spectroscopically**, esp. via IR and NMR. Mention other methods, as applicable, i.e., via UV and MS.
- Suggest how you might change the molecule synthetically, at one functional site minimally, and state what you hope to achieve efficaciously by doing so.

*** due on or before Monday, March 30, by 2 p.m. ***

N.B.: Optional Bonus Report, either option, is intended for enrichment; points therefrom are only considered as a grade component IF student's interim grade is a C or better (i.e., >55% approx weighting).

Lecture Outline (tentative, subject to change)

<u>Week</u>	<u>Date</u>	<u>Chapter-Lec</u>	<u>Topic</u>	<u>***EVENT***</u>
1	Jan 12	*12 + 13*	Review – IR, MS, NMR	
	Jan 14	15-1	Conjugated Systems, UV Spectroscopy	
	<u>Jan 16</u>	15-2		
2	Jan 19	***	*****	<i>Martin Luther King Holiday</i> ***
	Jan 21	15-3		
	<u>Jan 23</u>	15-4		
3	Jan 26	16-1	Aromatic Compounds	
	Jan 28	16-2		
	<u>Jan 30</u>	16-3		
4	Feb 2	17-1	Aromatic Compounds - Reactions	
	Feb 4	17-2		
	<u>Feb 6</u>	17-3		
5	Feb 9	18-1	Ketones and Aldehydes	
	Feb 11	18-2		
	<u>Feb 13</u>	18-3		
6	Feb 16	18-4		
	Feb 18	***	***** WEDNESDAY *****	EXAM I (Chapters 15-18)
	<u>Feb 20</u>	18-5		
7	Feb 23	19-1	Amines	
	Feb 25(Ash W)	19-2		
	<u>Feb 27</u>	19-3		
8	<u>Mar 2-6</u>	***	*****	SPRING BREAK ***
9	Mar 9	19-4		
	Mar 11	19-5		
	<u>Mar 13</u>	20-1	Carboxylic Acids	
10	Mar 16	20-2		
	Mar 18	20-3		
	<u>Mar 20</u>	21-1	Carboxylic Acid Derivatives	
11	Mar 23	21-2		
	Mar 25	21-3		
		***	*****	<i>last day to withdraw</i> ***
	<u>Mar 27</u>	22-1	Condensations and Alpha Substitutions of Carbonyl Compounds	
12	Mar 30	22-2	*** <i>Optional BONUS report due</i> ***	
	Apr 1	22-3		
	<u>Apr 3</u>	***	***** FRIDAY *****	EXAM II (Chapters 19-22)
13	Apr 6	23-1	Carbohydrates and Nucleic Acids	
	Apr 8	23-2		
	<u>Apr 9-13</u>	***	*****	<i>Good Friday, EASTER Monday</i> ***
14	Apr 15	23-3		
	<u>Apr 17</u>	23-4		
15	Apr 20	24	Amino Acids, Peptides, and Proteins	
	Apr 22	25	Lipids	
	<u>Apr 24</u>	26	Intro to Polymers	
16	April 27		*****	Cumulative FINAL EXAM, Monday, 9 – 11 a.m., FH-133