

Loyola University Chicago

**Syllabus Organic Chemistry A CHM 224 Sec. 010 Spring 2015**

January 12, 2015 – April 24, 2015 Lectures / Discussions / Exams

**Lecture:** M, W, F 09:20 AM - 10:10 AM Cuneo 210

**Discussion:** 011 R, 11:30 AM – 12:20 PM Flanner Hall 105

012 R, 02:30 PM – 03:20 PM Mundelein 520

**Instructor:** Donald May Contact: [dmay4@luc.edu](mailto:dmay4@luc.edu)

**Office:** Flanner Hall 403 Hours: **M,W, F** 10:30 AM – 11:30 AM

Other times by appointment.

**Required Materials:**

**Textbook:** Organic Chemistry, Wade, L.G., Jr., 8th ed., Prentice Hall, 2013.

ISBN 978-0-321-76841-4

**Optional:** - Study Guide and Solutions Manual, Wade & Simek, 8<sup>th</sup> ed.

- Molecular Model kit

As a possible study aid, you may want to consider purchasing, a paperback by D.R. Klein entitled “Organic Chemistry as a Second Language: Translating the Basic Concepts” (published in 2004 by John Wiley & Sons, Inc.; ISBN 0-471-27235-3; [www.wiley.com/college/klein](http://www.wiley.com/college/klein)). The goals of the latter book are to help the student develop the skills required to solve a variety of problems in organic chemistry and to point out the fundamental principles in organic chemistry. An additional study aid is a paperback by D.P. Weeks entitled “Pushing Electrons: A Guide for Students of Organic Chemistry,” Third Edition (Thomson Brooks/Cole); ISBN 0-03-020693-6. The first 3 chapters (pp. 1-161) of this workbook are intended to help a student understand “structure and bonding in organic molecules,” as well as techniques of “electron pushing” so as to comprehend reaction mechanisms.

Supplementary Textbooks:

Organic Chemistry, Tenth Edition, by T.W.G. Solomons and C. Fryhle (John Wiley & Sons, Inc., 2011).

Organic Chemistry, Eighth Edition, by J. McMurry (Brooks/Cole Publishing Co., 2012).

Organic Chemistry, by F.A.Carey and R.M. Giuliano, Eighth Edition (McGraw-Hill, Inc., 2011).

Organic Chemistry: Structure and Function, by K.P.C. Vollhardt and N.E. Schore, Sixth Edition (W.H. Freeman and Co., 2011).

**Method of instruction:** Lecture and discussion. Lectures may be supplemented with classroom discussion, use of molecular models, use of multimedia, and/or use of computer based materials as well as individual and/or group problem solving. Suggested problems will be given from the textbook but will not be graded. Discussion handouts will be completed and turned in after each discussion. Each discussion handout is worth 1 pt. each and these points are added the student’s individual point total from exams.

Criteria for discussion handouts: Discussion points are to be earned by the student. Possible credit is mainly based on class participation and attendance. Class participation is of paramount importance. Students must attend the discussion on time; students must have the discussion handout initialized by me to possibly obtain credit; students must personally turn in their own discussion handout on the announced due date: no early and no late handouts will be accepted (See Academic Integrity Violations); students must follow the directions on the handouts. Students are allowed and encouraged to work together on discussion handouts. **Grading:** Semester grades will be determined by the following criteria: Each weekly discussion will incorporate a handout worth one (1) point. Due dates will be given. The collective point total of the handouts will be added to the unit exams point total. Exams will incorporate theory up to and including all lectures and discussions, prior to the exam. The best two (2) out of three (3) unit exams (~100 pts. each) and one cumulative final exam (~200 points). See course/exam schedule. There are no early and no make-up exams. For a single, missed unit exam, that exam will be dropped. For a second and third missed unit exam, the score entered will be zero. The student must have a valid and verifiable reason for missing the final exam, such as a serious illness requiring hospitalization, and so forth, to be eligible for a make-up final exam, which will have a different format. Oversleeping, not knowing the date and time of the final exam or not being prepared and so forth, are not valid reasons. If a verifiable and valid reason cannot be provided a zero score for the final exam will be recorded. Students are expected to take care of their personal and professional issues before all lectures, discussions, and exams. Students are not allowed to leave during exams. If you leave, you must turn in your exam and you will be considered finished with the exam. Students cannot begin an exam and decide not to complete it. It is in the student’s best interest to complete each exam giving their best effort. Students must turn in all exam materials when finished. Exams cannot be taken from lecture: see Academic Integrity Violations. The grade-score correlation (curve) for each exam will be given after the grading of the exams. Answer keys to all discussions and exams will be posted in my display case (Flanner’s 4th floor west-end). All attempts will be made to return graded exams in the next discussion. Issues with graded exams must be submitted within 7 days of being returned, otherwise scores will be considered final. Students must submit a signed statement requesting a review of the question(s), although the entire exam is now subject to being re-graded.

**Final course grade:** Grades assigned will be: A, A-, B+, B, B-, C+, C, C-, D+, D, F

**Student Conduct:** Only students officially enrolled may attend. Students must attend the discussion sections for which they are officially enrolled. At all times students are expected to conduct themselves in a mature and professional manner, which includes but is not limited to: treating everyone in class with respect, avoidance of extraneous

comments and small group discussions during lecture. Eating, chewing gum/tobacco products and drinking (food items) are not allowed. Students are expected to take care of their personal matters before discussions/ lectures/exams. Additionally radios, headphones, cell-phones or similar devices are not permitted during discussions/ lectures/exams. Not all contingencies can be listed but inappropriate conduct will be addressed. Disruptive students will be asked to leave. If a cell phone rings (beeps, buzz, etc.) during any exam, the exam will be collected and the student will not be allowed to continue. Suggested textbook homework problems will be given but the student will not be required to turn them in. Exam questions, however, will come predominantly from lecture notes and from concepts related to suggested homework problems. If a student begins an exam it must be turned in for grading. Students are not allowed to leave the room during exams until their exam is handed in for grading. If you leave, you must turn in your exam and you will be considered finished. Please keep noises and sounds to a minimum. When leaving, be respectful and leave quietly. During exams, only religious caps/ hats/hoods are allowed: nonreligious caps, hats, hoods, visors and so forth, will not be allowed to be worn during exams. All personal materials, besides pencils and erasers, must be put away on the floor. Students will sit in every other seat during exams, if possible. Other specific instructions will also be given for exams.

**Academic Integrity:** Consult the Undergraduate Studies Handbook for additional information. 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, which can be viewed at: [http://www.luc.edu/cas/pdfs/CAS\\_Academic\\_Integrity\\_Statement\\_December\\_07.pdf](http://www.luc.edu/cas/pdfs/CAS_Academic_Integrity_Statement_December_07.pdf) Anything you submit that is incorporated as part of your grade in this course must represent your own work, unless indicated otherwise. All exams are closed book and closed note: No external materials or personnel are allowed. During exams, violations include but are not limited to: cell phone ringing, answering/using a cell phone, using unauthorized notes or books, looking at another student's exam, talking to other students, opening and/or utilizing anything in your book bag, and so forth. Any student found to be in violation or cheating will, at minimum, be given a zero for the assignment/exam and 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.

**Course Practices Required:**

College-level writing skills on exams: Communication skills for discussion and articulation of questions: Completion of reading assignments and hand-outs. It is recommended that the student read through each chapter before lecture and eventually work through the suggested problems.

**Learning Objectives:**

Students who successfully complete this course will be able to do the following at an acceptable level:

Name and draw simple and more complex organic structures;

Predict both physical and chemical properties as well as identify and name: ethers, aromatics, phenols, aldehydes, ketones, carboxylic acids, derivatives of carboxylic acid, and amines.

Describe and differentiate between various mechanisms, such as electrophilic versus nucleophilic aromatic substitution  
Relate reaction mechanisms to intermediates, stereochemistry, and kinetics; predict reaction mechanism from experimentally related data and vice versa

Work with multi-step reaction pathways; develop synthetic pathways to simple organic compounds

Use NMR, IR, UV, and mass spectrometry data to identify structures; predict the spectroscopic data from the structure

Predict the structure and stereochemistry of various carbonyl and other condensation reactions

Identify and describe biomolecules including carbohydrates, amino acids/proteins and heterocyclic/nucleotide/nucleic acids

**Disability Accommodations:** Students requiring accommodations at the University need to contact the Coordinator of Services for Students with Disabilities. The instructor will provide accommodations after receiving documentation from SSWD and allowance of a reasonable time frame for arrangements (minimally, one week in advance).

Accommodations cannot be retroactive. Information is available at: <http://www.luc.edu/sswd/>

**Important Dates:**

**Monday, January 19: No Classes: Holiday (Dr. Martin Luther King)**

**Monday February 09: Summer 2015 Registration**

**Monday - Friday, March 02 – March 06: Spring Break, No Classes**

**Monday, March 23: "W" day**

**Thursday-Monday, April 02 –April 06: Easter Holiday: Thursday: No Classes held after 04:15 PM;**

**Monday: Classes beginning after 04:15 PM are held**

**Friday, April 24: Classes End**

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

<b>Week</b>	<b>Date</b>	<b>Chapter</b>	<b>Topic</b>
1	01/12	12	Review: Infrared Spectroscopy, Mass Spectrometry;
	01/14		Spectra Interpretation
	01/16	13	<sup>1</sup> H-NMR Theory
2	01/19		<b>NO CLASS</b> , Holiday
	01/21		Chemical shifts, Splitting patterns
	01/23		Spectra interpretation
3	01/26		<sup>13</sup> C-NMR
	01/28	14	Ethers, Epoxides, Sulfides
	01/30		Nomenclature, synthesis, epoxide ring openings
4	02/02	15	Conjugated Systems, kinetic versus thermodynamic control
	02/04		Molecular orbital theory, Diels-Alder reactions
	02/06	16	Aromatic compounds/ions, Characteristics, Huckel's rule
5	02/09		<b>EXAM I</b>
	02/11		Nomenclature: o, m, p di-substituted rings
	02/13	17	Reactions of Aromatic compounds
6	02/16		Electrophilic Aromatic Substitutions
	02/18		Nucleophilic Aromatic Substitutions
	02/20	18	Aldehydes and Ketones: Nomenclature; Physical properties
7	02/23		Spectroscopy, Synthesis, Reactions;
	02/25		Imine Formation; Mechanisms
	02/27		Hemiacetals/Acetals Mechanisms
8	03/02		<b>NO CLASS</b> , SPRING BREAK
	03/04		<b>NO CLASS</b> , SPRING BREAK
	03/06		<b>NO CLASS</b> , SPRING BREAK
9	03/09	19	Amines, Classification, Nomenclature; Physical properties;
	03/11		Spectroscopy,
	03/13		Synthesis, Reactions
10	03/16		<b>EXAM II</b>
	03/18	20	Carboxylic Acids, pK <sub>a</sub> 's; physical properties; Spectroscopy,
	03/20		Synthesis/Reactions of Carboxylic acids;
11	03/23		Last day for "W"
	03/25	21	Carboxylic Acid derivatives, Nomenclature, Physical properties, Spectroscopy,
	03/27		Synthesis, Reactions
12	03/30		Synthesis, Reactions, Mechanisms
	04/01	21	Synthesis, Reactions, Mechanisms
	04/03		<b>NO CLASS</b> , Easter Holiday
13	04/06		<b>NO CLASS</b> , Easter Holiday
	04/08	22	Condensations of Enols; Enolizable Protons, Keto-Enol Tautomerism;
	04/10		alpha-substitutions; Aldol Condensations;
14	04/13		<b>EXAM III</b>
	04/15	23	Carbohydrates Classification
	04/17		Chair Conformations/Haworth Projections
15	04/20		Reactions of Carbohydrates;
	04/22		Disaccharides/Polysaccharides, Nucleic Acids
	04/24	24	Amino Acids and Polypeptides, Levels of structure
16	04/27		<b>NO CLASS</b>
	04/29		<b>NO CLASS</b>
	05/01		<b>NO CLASS</b>
17	Sat. 05/02		<b>FINAL EXAM 01:00 PM - 03:00 PM</b>

**The instructor reserves the right to modify any and all of the policies and scheduling contained in this syllabus, at any time.**