

Loyola University Chicago

Syllabus Organic Chemistry A CHEM 223 Sec. 008; Tuesday, August 28 - Thursday, December 06; Fall 2018

Prerequisite: CHEM 102 or 106; Lecture: T, R 08:30 AM - 09:45 AM; CUNEO HALL 109;

Instructor: Donald May Contact: dmay4@luc.edu Office: Flanner Hall 403:

Discussion: 009, W 11:30 AM – 12:20 PM Flanner Hall 105; 010 W 12:35 PM – 01:25 PM Flanner Hall 105

Required Materials: Textbook: ORGANIC CHEMISTRY by David Klein; 3rd edition

Optional: - Student Study Guide and Solutions Manual, ISBN 978-1-119-37869-3

- 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" (I&II); 2004 by John Wiley & Sons, Inc.; ISBN 0-471-27235-3; www.wiley.com/college/klein. These 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, Eighth Edition by Wade (Pearson; 2016)

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, 6th 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. Students are allowed and encouraged to work together on discussion handouts. Participation is of paramount importance. Students are expected to attend the discussion on time; students must have the discussion handout initialized by the instructor to possibly obtain credit; students must turn in their own discussion handout on the announced due date: no late handouts will be accepted; students must follow the directions on the handouts. Discussion handouts will contribute 10% toward the final grade: the single, lowest discussion handout score will be dropped: any single missed discussion handout will be the dropped score with any additional missed discussion handouts incorporated with a zero score. Students must attend the lecture/discussion to receive the handout and turn in the handout, on the due date. Discussion handouts must be completed: in regular #2 or HB pencil only, are expected to be neat and legible, free of scribbling/scribbled responses, incorporate correct chemical symbols (Review the Chemical Periodic Table of the Elements). The instructor reserves the right to modify any and all of the course requirements at any time.

Final course grade assigned: A: 100% – 86.0% A- : 85.9% – 81.0% B+: 80.9% – 76.0%

B: 75.9% – 71.0% B-: 70.9% – 66.0% C+: 65.9% – 61.0% C: 60.9% – 56.0% C-: 55.9% – 51.0%

D+: 50.9% – 46.0% D: 45.9% – 41.0% F: < 41.0%

Grading: Semester grades will be determined by the following criteria: discussion handouts at 10%, Three unit exams with the comprehensive final; Final grades will be determined from one of the following unit exam/ final exam contribution options, whichever is higher:

EXAM CONTRIBUTION OPTION 1: All three (3) unit exams at 20% each = 60% + final exam 30% = 90%

EXAM CONTRIBUTION OPTION 2: Best two (2) unit exams at 20% each = 40% + final exam 50% = 90%

OPTION #1: Discussion Handouts: 10%

3 Unit Exams@60% + Final Exam@30%

Total: 100%

OPTION #2: Discussion Handouts: 10%

2 Unit Exams@40% + Final Exam @50%

Total: 100%

No early and no make-up in-class exams; No late discussion handouts. For a single, missed in-class unit exam, Option #2 automatically will be utilized to determine the final course grade. Any subsequent missed in-class exams will be scored as zero. See attached schedule. Students engaged in official university off-campus activities will need to make arrangements proactively for missed course assignments, in providing the appropriate signed documentation in advance of the date missed. Exams will incorporate all theory up to and including all lectures and discussions, prior to the exam. There are no early and no make-up unit exams. Students must bring and present their Loyola I.D. to each exam. 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. If a student begins an exam it must be turned in for grading. Students must turn in all exam materials/pages when finished. Exam copies cannot be taken from lecture: see Academic Integrity Violations. The student must have a valid and verifiable reason for missing the final exam, such as a serious illness requiring hospitalization, and so forth. 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. Any make-up final exam will be in a different format.

Student Conduct: Only students officially enrolled for the course may attend. Students must attend only the discussion section for which they are officially enrolled. Students missing lecture should get the lecture notes from a classmate. Any power-point presentation utilized will be uploaded and made available on SAKAI. 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. 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 to others 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, will be placed at the front of the room, if available. 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 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. Option #1 will automatically apply and a zero for that exam will be recorded. Depending on the seriousness of the incident, additional sanctions may be imposed. **Materials from the course cannot be shared outside the course without the instructor's written permission. Students may not be aware of copyright and intellectual property rights.**

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 before the exam. Tutoring is available in the Sullivan Center; The ACS Loyola Chapter also provides tutoring, free of charge, on a walk-in basis, during the week in Flanner 129 (days/time announced); A few graduate students serve as private, one-to-one tutors but have individual rates of remuneration/monetary compensation for their services.

Learning Objectives: Students who successfully complete this course will be able to do the following at an acceptable level: Relate molecular orbital hybridization to bonding types, angles, geometry; Name and draw simple and more complex organic structures; Predict both physical and chemical properties of alkanes, alcohols, alkenes, alkynes and alkyl halides; Differentiate between isomer types (structural and stereo) and conformers; predict and name different stereoisomers; Describe and differentiate between various mechanisms, such as elimination versus 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 nuclear magnetic resonance (NMR), infrared (IR), ultraviolet (UV), and mass spectrometry (MS) data to identify structures; predict the spectroscopic data from the structure

Disability Accommodations: Students requiring accommodations at the University need to be proactive and contact the Coordinator of Services for Students with Disabilities. Accommodations are provided after receiving documentation from SSWD and allowance of a reasonable time frame for arrangements (minimally, one week in advance). Accommodations cannot be retroactive. Contact: <http://www.luc.edu/sswd/>

Important Dates: Monday, September 03: No classes: Holiday (Labor Day)

Monday- Tuesday, October 08 - 09: No classes: Fall Break

Friday, November 03: "W" day Monday, November 06: Spring Registration

Wednesday- Friday, November 21-23; No classes: Holiday (Thanksgiving)

Academic Calendar, www.luc.edu/academics/schedules Students wanting to drop lecture after midterm may stay in the co-req lab only if midterm grade, posted in LOCUS, is a D or better. Students should continue to attend lecture until the week of the drop date to gain as much background knowledge as possible. For Fall 2017 students wishing to drop lecture, and have a mid-term grade of D or better, can seek assistance from the Department of Chemistry and Biochemistry office beginning Monday 10/30 at 9:00am through Friday 11/03 at 4:00pm. Students with a midterm grade of F must drop the co-req lab along with the lecture. No exceptions. **Course Repeat Rule** Effective with the Fall 2017 semester, 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 Department of Chemistry & Biochemistry website: <http://www.luc.edu/chemistry/forms/> and obtain a signature from the Undergraduate Program Director, Assistant Chairperson, or Chairperson in Chemistry. A copy of this form is then taken to your Academic Advisor in Sullivan to secure final permission for the attempt.

EXAM DATES: Tentative

Tuesday, September 24: EXAM I

Tuesday, October 23: EXAM II

Tuesday, November 20: EXAM III

Saturday, December 15: FINAL EXAM 09:00 AM – 11:00 AM

Lecture Outline (tentative, subject to change)			
Week	Date	Chapter	Topic
1	08/27	01	Lewis structures, bonding, resonance,
	08/29		formal charges,
2	09/04		NO CLASS Labor Day Holiday
	09/06	02	Molecular Orbital Theory, hybridization, bond rotation Alkanes, nomenclature,
3	09/11	02, 03	Acid-Base conjugates
	09/13		Curved arrow notation
4	09/18	04	Newman Projections/conformational analysis, Cycloalkane nomenclature
	09/20	04	Chair conformations
5	09/25		EXAM I
	09/27	05	Stereochemistry, chirality/chirality centers enantiomers, optical activity
6	10/02	05	Fischer Projections; R, S configurations; Alkyl halides, nomenclature, properties,
	10/04	06	Reaction rates and mechanisms,
7	10/09		NO CLASS Midterm Break
	10/11	06, 07	Alkyl Halides; SN1, SN2
8	10/16	07	E1, E2 reaction mechanisms
	10/18	08	Alkene nomenclature, alkene stability, degrees of unsaturation
9	10/23		EXAM II
	10/25	08	Alkene reactions, halogenation,
		08	hydration, carbocation rearrangements
10	10/30	08, 09	Hydroxylation, oxidative cleavage; Syntheses
	11/01	09	Alkynes, nomenclature, reactions; Syntheses
11	11/06	10	Free radicals, bond dissociation energy;
	11/08	10, 11	Radical mechanisms, reaction profiles; Syntheses
12	11/13	12	Alcohols, classification, properties, nomenclature
	11/15	12	Reactions of Alcohols: oxidation, halogenation, dehydration, carbocation rearrangements
13	11/20		EXAM III
	11/22		NO CLASS Thanksgiving Break - Holiday
14	11/27	13	Ethers; nomenclature, physical properties
	11/29		Synthesis and reactions of ethers,
15	12/04	14	Infrared Spectroscopy (IR)
	12/06	14	IR spectra interpretation, Mass Spectrometry (MS)
16	12/15		Saturday, December 15: FINAL EXAM 09:00 AM – 11:00 AM