Chemistry 224-004 – Spring 2016 – Syllabus

Course: Chemistry 224, Organic Chemistry B, 3 Credits, Lecture and discussion
Prerequisites: Chemistry 223 or 221 – a student missing a prerequisite may be withdrawn at any time
Lecture: MWF 9:20 am -10:10 am Section 224-004
Discussion: W 10:25-11:15; 11:30-12:20; you may attend only the section for which you are registered

Instructor & Contact Information

Dr. Sandra Helquist, Flanner Hall 200B (shared office, please knock)
Email policy: to receive a response, either use the email function in Sakai to send to Instructor (via select recipients) and leave subject line blank OR use your Loyola email address and put only "Chem 224-004" in the subject line, send to shelquist@luc.edu; in most cases I will be able to respond within 24 hours during the week when I am on campus.
Office Hours policy: just show up! You are welcome to stop by at any time to see if my door is open (and refer to the schedule posted outside the door) with any questions, thoughts, concerns, and other issues. Scheduled office hours are by walk-in, no appointments, just show up: M 10:30am-12pm; T 11:30am-12:20pm; W 2:45-3:45pm; F 12-1:20pm. Additional office hours, in person and online via Adobe Connect may be held by announcement or by appointment.

Course Materials

Organic Chemistry, Wade, 8th edition, Prentice Hall, hard copy or eText (Required)
Highly recommended: Organic Chemistry II: As a Second Language, Klein; use of a molecular modeling kit and the solutions manual for the textbook is also recommended; the books are also on reserve at the library. Daily access to your Loyola email account and Loyola's Sakai site sakai.luc.edu are also required to receive communications from the instructor and to access course materials, assignments, scores. You will not be permitted to use a calculator on exams.

Course Content & Objectives

Content-specific Objectives Topics will include: conjugated π systems, aromatics, carbonyl compounds, amines, carboxylic acids and their derivatives, carbohydrates, amino acids, biopolymers. The student should learn how to:

1. apply material (principles, concepts, skills) learned in the first semester course (nomenclature, structure, reactions, mechanisms, spectroscopy, synthesis) to the study of second semester topics.
2. identify the various classes of organic compounds, their methods of preparation, and typical reactions.
3. name and draw specific organic compounds.
4. postulate a *logical* reaction mechanism for organic reactions.
5. discriminate among relative stabilities of reaction intermediates.
6. plan and write out multi-step syntheses using known functional group transformations, including syntheses of polyfunctional organic compounds.
7. name, draw and interpret the 2- and 3-dimensional structures of important biopolymers, and techniques for their synthesis and characterization.
8. analyze and interpret data from various instruments used in separating and identifying organic compounds including: IR, NMR, UV-vis and MS.

IDEA Objectives These objectives include learning outcomes beyond this course and will apply across multiple courses and disciplines as you develop as an independent learner at Loyola. These have been selected by the Organic faculty:

1. Gaining factual knowledge (terminology, classifications, methods, trends)
2. Learning fundamental principles, generalizations, or theories
3. Learning to *apply* course material (to improve thinking, problem solving, and decisions)
4. Learning how to find and use resources for answering questions or solving problems
5. Learning to *analyze* and *critically evaluate* ideas, arguments, and points of view

Expectations

I expect you to show up on time for each class and to come prepared, having kept up with the material by working problems and having read ahead in the textbook. I expect you to use class and office hour time to learn the material by engaging with classmates and asking questions. Make-up assignments are not available for this course. You will need to contact a classmate for notes, sections/topics covered if you miss a class. Be courteous: save your electronic messaging for after class. Plan your schedule so you have at least 10 hours per week outside of class for reading, working problems, asking questions, i.e, studying (learning) the material on a Daily Basis. You may require up to 20 hours per week depending on prior preparation for this course. Make time for this course every day: do not count on cramming on weekends or before exams as you will be much less likely to master the course objectives listed above.

Accommodations

Students requiring accommodations must provide appropriate documentation from the University and meet with the instructor to discuss arrangements. Accommodations are provided after receiving documentation and allowance of a reasonable time frame for implementation: minimally, one week in advance of an exam. Accommodations cannot be retroactive. Students with disabilities should visit: http://www.luc.edu/sswd/

Academic Integrity

You are encouraged to study with other students on a daily/weekly basis, however, anything submitted for an individual grade during or outside of class must represent your own knowledge and understanding of the material. Evidence of unauthorized collaboration will result in, at a minimum, a "zero" on the item and penalty up to failure of the course, as well as referral to the Dean's Office. For the Undergraduate Catalog statement on academic integrity, visit: http://www.luc.edu/academics/catalog/undergrad/reg_academicintegrity.shtml

Grading Graded assessments (quizzes, exams) will be used to assess your level of mastery of the Course Content and Objectives as listed on the first page of this syllabus, and Course Grades will be assigned based on the quality of achievement you demonstrate on graded assessments. Extra/make-up assignments are not available for this course. Your Chemistry 224 grade will depend on the following: Participation 4% + Quizzes 16% + Exams 80% = Total 100% Letter grades are based on fixed percentages for this course so that all students are graded based on consistent standards. Generally, 85.0% is the lowest A-; 70.0% is the lowest B-; 55.0% is the lowest C-; 40.0% is the lowest D. Cutoffs for plus/minus grades are not published as they will be determined by the overall distribution of course scores.

Participation: The purpose of participation assignments is to help all students keep pace with the class, as well as to inform the instructor and the class of common misconceptions. You will get as much benefit from these assignments as you choose to put forth in your individual effort. There will be 1-3 assignments per week as needed. Assignments will be submitted mostly during class, and occasionally pre- or post-lecture. Most submissions will be electronic but some will require submission of a hard copy. Each assignment will be worth one point, and will be graded based on timely and meaningful completion. Remember, there are no make-up assignments for this course.

Quizzes: The purpose of quizzes in general is for the benefit of the student as a learning tool: use the feedback you receive to adjust your daily studying habits. The purpose of the dropped quiz policy is primarily to account for unavoidable absence by the student: every missed quiz receives a score of zero. No early quizzes, no make-ups! Quizzes will be given individually and/or in groups, in class and/or as take-home activities. Most quizzes will be given in class, and dates/times/content of quizzes may or may not be announced in advance. Keep up! Come to class prepared! The lowest quiz score will be dropped at the end of the term; all remaining quiz scores will be averaged (by percent, so that equal weight is given to each quiz) to obtain the overall quiz contribution to the course grade.

Exams: The purpose of the exams is to assess your individual level of mastery of the Course Content and Objectives. No early exams, no make-ups! Unexcused absence (traffic, weather, oversleeping, forgetfulness, etc) results in a ZERO. Excused absences require documentation of an unforeseeable emergency but do not result in a make-up exam.

- Midterm Exams: 50 minutes, February 10, March 4, April 8, 16% each toward course grade. Organic chemistry material is highly cumulative over 2 semesters: all exams will require application of prior knowledge.
- Final Exam: Saturday May 7th 1-3 pm as scheduled by the University, 32% of course grade. The final exam is Mandatory and Comprehensive, with emphasis on material covered after 3rd midterm exam, to be discussed in class.

Exam Procedure: Use of your own models is permitted. Phones, other electronic devices, calculators are not permitted. If seen or heard, will be confiscated along with exam copy and student will be asked to leave. Seating arrangements may be altered before or during the exam. Show up early with two items: (1) your Loyola ID, visible on desk to be checked; (2) working pencil(s) or standard blue/black ink pens. All jackets, bags, loose accessories, etc must be left at the front of the classroom. Once the exam is distributed, if you exit the room (quietly, please), for any reason before time is up, your exam is considered complete and will be collected. I will return your midterm exams *during the discussion periods or in office hours* (copies will be kept). Scoring errors must be brought to my attention in person no later than one week after the exams are returned. The final exam cannot be returned.

Homework: Preparation, Practice, Self-Assessment

Very Highly Recommended: On quizzes and exams you will be expected to answer questions and solve problems, so you should study by answering questions and solving problems, i.e., applying the concepts discussed in class and read from your textbook to non-generic compounds. When you cannot answer a question correctly on the first attempt, do not dismiss it! Figure out WHY you made the mistake (particularly important if you cannot identify the type of problem or if you have a misconception about the material), WHY the correct answer is correct, HOW you can recognize and apply the correct concepts and methods for solving that type of problem in the future, and FINALLY, attempt several more problems of that type until you can solve on the first attempt. Come to office hours for help with any part of this process as often as needed, especially if you do not understand why/how you are making particular mistakes! **Pre-lecture:** The purpose of reading ahead and working problems within the textbook sections is to help you come prepared to get the most out of our class time: I expect you bring questions to class. **Post-lecture:** Review notes/textbook as needed, then complete as many of the end-of-chapter exercises as possible every day. The purpose of these problems is to help you continue to learn the material and to self-assess, critically and honestly, so you can gauge your progress toward meeting the course objectives. Use these to determine how much help and extra practice you need on a daily basis and prior to exams. A list of Very Highly Recommended textbook problems will be posted on Sakai.

Best Practices & Suggestions

Students often ask me, "How do I get a/an (fill in grade of choice here) in this class?" The answer is simple (see the grading policy for the course), but the process of learning is challenging and can even be uncomfortable as you are pushed to expand the boundaries of your knowledge and abilities. Grades are earned based on quality of achievement in the course, with the top grade of 'A' earned by demonstrating complete (not partial) mastery of all (not some/most) of the course material on all (not some/most) of the quizzes and exams. To earn a minimum passing grade you will need to demonstrate good mastery of most of the course material. So what does it mean to demonstrate mastery of course material? Please refer back to the first page of this syllabus for the overview of Course Content and Objectives: you will be assessed on all of these. Trying to take a shortcut in one area will often be detrimental in another area. My primary concern is to provide you with the tools, environment, and encouragement to learn chemistry, and from there it is up to you to determine your level of achievement. Please continue reading for the best suggestions I have from my own experience as a student and as a teacher, and the experiences of my mentors, colleagues, and former students.

1. Remembering topics is necessary but not sufficient: Understanding the material is crucial. There are many ways to state this distinction, for example: you need to know more than the chemistry content, you must understand the chemical concepts. You should already have some experience with this distinction from your prerequisite Chemistry courses as well as having learned that simply trying to memorize content does not typically lead to sustained learning. You will be asked to recognize, explain and predict trends in structure, properties and reactivity, so get curious! It is one thing to know what happens, but it is often more satisfying to know why it happens.

2. Chemistry material, by nature, is highly cumulative. You must have good to excellent understanding of the concepts from the first semester Organic Chemistry in order to apply that knowledge as you begin to learn the second semester material. We will refer back to basic concepts and principles of the first semester material incessantly and relentlessly. Review early and as often as needed – see me with review questions early and as often as needed!

3. To deal with the highly cumulative nature of the material, the best plan is to study by working problems every day so you are prepared for each class and each new topic covered. Work the recommended problems until you can complete them on the first attempt without assistance from your notes, book, classmates, tutors, or the solutions manual. Ask yourself each time: what type of problem is this? Break up your studying, know when you have reached your limit for new content and take a break, give yourself time to process and assimilate before moving on to even more new material. In the academic year, plan on 1.5 to 2.5+ hours every day of the week. Falling behind is unacceptable if you wish to fundamentally understand concepts in order to apply them to solve problems and demonstrate mastery of the material.

4. Foundational concepts, trends and patterns are still your friends. If you attempt to memorize everything separately, you will have great difficulty distinguishing problems types and will soon reach your limit of remembering even the basic content. We will spend significant time in class discussing/highlighting/reviewing how structure connects to reactivity patterns: nucleophiles, electrophiles, acids, bases, and sometimes redox. Make sure you understand the general reactivity of each class of compound based on each structure: look for the trends!

5. Even though I am asking you not to rely strictly on memorization, you will still have to remember content. Remembering is a prerequisite for understanding, applying, and analyzing: these levels of learning will form the basis for your assessment. If you are curious, check out this interactive pyramid depicting Bloom's Taxonomy:
http://media.ccconline.org/ccco/FacWiki/TeachingResources/Blooms_Taxonomy_Tutorials/BloomsTaxonomy_Verbs_Pyramid/BloomsTaxonomyVerbsPyramid.swf
As you continue in your undergraduate coursework, the transitions from 100- to 200- to 300-level courses will include transitions to higher-order thinking skills being emphasized for your learning and assessed in your coursework.

6. Form a study group. Learn from and teach your peers. Share your own best practices and suggestions.

7. Ask questions. Of yourself, of your classmates, of the instructor.

8. Learn from your mistakes. This is part of critical self-assessment, and is not limited to the course content.

9. Take ownership of your learning. It is up to you to determine your level of achievement in this and other courses, and it is up to you to access resources for help as often as needed: office hours, tutoring, study groups, mentoring, and more.

10. Practice, practice, practice. Ask questions, answer questions and solve problems every day.

If you are solving problems and asking questions on a Daily Basis, you have already studied for your Exams by learning the course material! Begin to review for each test a few days in advance. You may wish to use the Summary: Reactions of (class of compound), Essential Problem Solving Skills, Essential Terms listed at the end of chapter as a review tool, or to make your own study guides from lecture outlines or quizzes prior to exams. Find a review method that works for you: meet with classmates and quiz each other, bring additional questions to office hours. When you are taking any exam, read the instructions and questions carefully, spend your time well, start with the problems you know you can solve, write out your work so you can check it, and clearly indicate answers as appropriate.

Tentative Lecture Schedule & Attendance Policy

Introduce yourself to multiple classmates early in the course. Our actual pace may vary from this schedule: if you miss a class for any reason, it is your responsibility to immediately contact a classmate for notes and sections/topics covered, as you are still responsible for all material covered and assigned. I do not provide notes, outlines or summaries. Lectures will be presented using "chalk talks" and slides/handouts/links/animations, with additional resources posted on Sakai as appropriate.

We will not cover every topic in every chapter of the textbook this semester. Focus first on the material that is directly covered in lecture and assigned or recommended. Explore the additional material in the textbook for your own interest and enrichment.

Week	Dates	Monday	Wednesday	Friday
1	Jan 18, 20, 22	MLK HOLIDAY	Chapter 12, 13: Spectroscopy Review	Chapter 12, 13: Spectroscopy Review
2	Jan 25, 27, 29	Ch. 15: Conjugated Systems, MO's	Ch. 15: Conjugated Systems, Reactions	Ch. 15: Conjugated Systems, Reactions
3	Feb 1, 3, 5	Ch. 15: Diels-Alder Reaction, UV	Ch. 16: Benzene Properties, MO's	Ch. 16: Aromatic, Non, Anti, Compounds & Ions
4	Feb 8, 10, 12	Ch. 16: Common Aromatics, Properties	**EXAM I Chapters 12-16**	Ch. 17: Electrophilic Aromatic Substitution
5	Feb 15, 17, 19	Ch. 17: Friedel-Crafts Rxns, Directing Effects	Ch. 17: Directing Effects, NAS	Ch. 17: Side-Chain Reactions, Synthesis
6	Feb 22, 24, 26	Ch. 18: Carbonyl Structure Properties, Synthesis	Ch. 18: Carbonyl Synthesis, Rxns w/Strong & Weak Nu	Ch. 18: Carbonyl Condensation Rxns
7	Feb, Mar 29, 2, 4	Ch 18: Synthesis, Carbonyl RedOx	Ch. 19: Amine Structure, Nomenclature, Properties	**EXAM II Chapters 17-19**
8	March 7-11	SPRING BREAK		
9	March 14, 16, 18	Ch. 19: Amine Basicity & Aromaticity	Ch. 19: Aromatic Amine EAS, NAS, Synthesis	Ch. 19: Amine Nucleophilic Rxns, Oxidations
10	March 21, 23, 25	Ch. 19: Amine Synthesis	Ch. 20: Carboxylic Acids, Properties, Nomenclature	EASTER HOLIDAY
11	March/April 28, 30, 1	EASTER HOLIDAY	Ch. 20: Acidity, Salts, Synthesis, Nuc. Acyl Subst.	Ch. 20: Acid Reactions
12	April 4, 6, 8	Ch. 21: Acid Derivative Nomenclature, Reactivity	Ch. 21: Nucleophilic Acyl Subst, Review	**EXAM III Chapters 19-21**
13	April 11, 13, 15	Ch 22: Tautomerization, Enols, Enolate Ions	Ch. 22: α-Carbon Rxns, Aldol Condensation	Ch. 22: Claisen Rxns, Malonic Ester Synthesis
14	April 18, 20, 22	Ch. 23: Carboyhydrate Structure, Classifications	Ch 23: Monosaccharide Rxns, Review	Ch 23: Di/Polysaccharides, Nucleic Acids
15	April 25, 27, 29	Ch. 24: α-Amino Acid Structure, Properties	Ch 24: Amino Acid Synthesis	Ch 24: Amino Acids, Peptides, Proteins
Saturday May 7, 1-3pm FINAL EXAM: Comprehensive				

Other Items

A link to the official Loyola calendar can be found here: http://luc.edu/academics/schedules/index.shtml
The Withdraw deadline for the semester is Monday March 28th at 5:00pm
For information about Loyola tutoring in the Sullivan Center, see: http://www.luc.edu/tutoring/
Links, Resources, and other items will be posted under Course Materials on Sakai

Best wishes for a successful semester. I enjoy conceptual challenges, problem-solving, and trying to figure out why and how students make mistakes in order to correct misconceptions. I expect to provide you with support, guidance, and encouragement as we work toward the course objectives listed above, both for the organic chemistry content, and for the broader IDEA objectives. Please ask me to provide additional help as needed.