

Syllabus for Organic Chemistry II  
Chemistry 222, Section 001  
4.0 Semester Hours  
Spring Semester, 2012

**Lectures:** M,W,F --- 2:45-3:35 p.m., FH-105.

**Discussion Section:** T --- 1:00-2:15 p.m., Cudahy Hall, Room 202.

**Laboratory:** T,Th --- 2:30-5:15 p.m., LSB-115.  
“Check-in” : Tuesday, January 17

**Instructor:** Dr. Babler (Office: FH-209-210).  
e-mail: [jbabler@luc.edu](mailto:jbabler@luc.edu)

**Office Hours:** M,W -- 3:45-5:15 p.m.  
F ---2:00-2:30, 4:00-5:00 p.m.  
Other times by appointment, please --- except on the day **prior to each hour exam**, when office hours are 2:30-6:30 p.m.

**Prerequisites:** Chemistry 221 or its equivalent.

**NOTE:** If you received a final grade of D<sup>+</sup>, D, F, W or WF in CHEM 221 last semester, you are not allowed to take Organic Chemistry II this semester.

**Content:** This course is the second semester of a comprehensive and somewhat rigorous survey of aliphatic and aromatic organic chemistry, with particular emphasis on reactions from both a synthetic as well as a mechanistic viewpoint. The topics include: aromatic compounds, including phenols and aryl halides as well as a thorough discussion of delocalized chemical bonding; aldehydes and ketones; enols and enolates; amines and nitrogen heterocycles; carboxylic acids and their derivatives;  $\beta$ -dicarbonyl compounds; lipids such as fatty acids and triglycerides; and carbohydrates.

**Learning Outcomes:** Students will develop an understanding of the chemical behavior of moderately complex organic molecules and the mechanisms by which such reactions occur. Students will also expand their knowledge of spectroscopy and its use as a powerful tool for structure determination of organic molecules. Finally, students will be introduced to the logistics in planning the total synthesis of polyfunctional organic compounds, especially those possessing aromatic rings.

**Assignments:** Students are strongly advised to read the assigned pages in the textbook by Vollhardt and Schore and to work some of the suggested problems (listed on the attached sheet). However, there will be no formal homework assignments!

Attendance at the scheduled discussion section is strongly recommended, but not required. The instructor will generally use the time allotted for discussion section to answer students' questions and to work some of the recommended problems from the textbook.

**NOTE:** Even though attendance at the discussion section is optional, those weekly sessions are a valuable part of the course since they offer students the opportunity to ask questions and/or request that certain topics be clarified or explained in greater detail. Due to the vast number of topics that an organic instructor is required to cover during the formal course lecture, little (if any) time is available to answer students' questions during the lecture section. If you do have an urgent question that arises during the lecture, and you prefer not to wait until the next discussion section, feel free to ask such questions at the end of the lecture section.

Unless you are excused by the instructor, students are required to perform the lab experiments. **NOTE:** Failure to complete these experiments during the regularly scheduled lab sessions will result in a grade of "I" for CHEM 222. This grade will subsequently be changed to an "F" on your transcript unless arrangements can be made for you to complete the experimental work within six weeks of the end of the semester. Permission for students to conduct "make-up" experiments will be granted only for very serious reasons -- e.g., if a student has been hospitalized.

**Grading:** Three hour exams will be given during the semester, as well as a final examination.

Distribution of points:

|                         |            |
|-------------------------|------------|
| Hour Exam I:            | 135        |
| Hour Exam II:           | 100        |
| Hour Exam III:          | 140        |
| Lecture Final Exam:     | 250        |
| Laboratory Assignments: | 200        |
| Total:                  | 825 points |

**Grading Scale:**

Exams (excluding any lab exams):

A = 500-625; B<sup>+</sup> = 460-499; B = 400-459; B<sup>-</sup> = 360-399; C<sup>+</sup> = 310-359; C = 250-309; C<sup>-</sup> = 210-249; D<sup>+</sup> = 165-209; D = 125-164; F = 0-124 points.

**Laboratory Work:** On Tuesday afternoons (2:30 – 5:15 p.m.), you will perform the lab experiments that are required for students registered for CHEM 226 (Organic Chemistry Lab B). If the Tuesday afternoon lab involves a “preparative experiment,” the subsequent Thursday lab session will be used to characterize (e.g., proton NMR, IR, TLC) the organic product you have prepared two days earlier. In addition to the experiments required for students registered for CHEM 226, you will also perform four

additional preparative experiments: "Preparation of Isoprene Bromohydrin;" "Conversion of *p*-Acetamidophenol to *p*-Ethoxyacetanilide;" "Beckmann Rearrangement of Cyclohexanone Oxime to Caprolactam;" and "Preparation of an Azo Dye (**Para Red**)."

On Thursdays during the latter part of the semester (probably March 22<sup>nd</sup> – April 19<sup>th</sup>), your assignment will be "Organic Qualitative Analysis --- Identification of Two Unknown Compounds" (which may be "polyfunctional"). For each "unknown," you will conduct various preliminary and classification tests, followed by spectroscopic analysis (IR, proton NMR, and <sup>13</sup>C-NMR) of the compounds. One of your unknowns will be a solid; the other will be a liquid sample. **Each of these unknowns will be incorporated into your lab grade as if it were worth 1.5 times as much as each "CHEM 226 experiment" ---- i.e., the "2 unknowns" will represent the value of "3 Tuesday experiments."**

A separate grading scale is used for lab work:

A = 180-200; B+ = 174-179; B = 164-173;  
B- = 160-163; C+ = 150-159; C = 140-149;  
C- = 130-139; D+ = 120-129; D = 110-119 points.

Your lab grade will be incorporated into your final grade for CHEM 222 by adding the total points received for your lab assignments to your total number of points received on hour exams and the lecture final exam.

**NOTE:** There is no penalty if a student misses an hour exam; instead his/her final exam score will be used to determine a larger % of the final grade. For example, if one misses the second hour exam, his/her final examination score would represent 42.4% (i.e., 350 points) of the final grade. No "make-up" hour exams will be administered.

**WARNING:** Since you are allowed to use an 8.5 x 11" sheet of notes as an aid during the final exam for the lecture section of this course, some of you may be tempted to skip the other tests. Despite the availability of such notes during the final exam, it usually proves to be quite difficult; and therefore you should miss an exam only in case of serious illness and the like!

**NOTE:** If the organic instructors are asked to administer a "standardized organic exam" (for purposes of assessment) at the end of the semester, that exam might be given in place of the regular final exam. Under such circumstances, you could **not** use a sheet of notes as an aid during the exam. Furthermore, a separate grading scale would be used for this "standardized exam" and that grade will be adjusted prior to being incorporated into your final grade for CHEM 222.

Hour exam I will be given on Friday, February 17; hour exam II will be administered on Friday, March 16; and the third hour exam is scheduled for Friday, April 20. The final exam for the lecture section of this course is comprehensive and will be given on Thursday, May 3, 1:00 – 3:00 p.m. (Central Daylight Savings Time!). **NO** "early" final exams will be administered.

**NOTE:** The Chemistry Department administers make-up final exams (different from the regular final exam) to those students who have a legitimate excuse (e.g., death in the immediate family; serious illness --- which does not include organophobia!; a court appointment that cannot be rescheduled, etc.). If for one of the latter reasons you are unable to take the regularly scheduled final exam, please inform the instructor (e-mail: jbabler@luc.edu) promptly --- but no later than 48 hours after the date of the final exam -- so that a final grade of “I” can be assigned to you.

**NOTE:** A grade of “I” will not be assigned to you unless you can verify that there was a valid reason for your missing the final exam (e.g., hospitalization or death in the immediate family). Even if your final grade is an “I,” you are still required to take a “make-up” final exam or the “I” will be converted to an “F” by the Dean’s office.

**NOTE:** Oversleeping; forgetting what day it is; not being “ready to take a final exam yet;” etc., are not valid excuses for missing the final exam. The Chemistry Dept. will not accept such explanations from students, and a grade of “0” will be assigned for your final exam score!

The last day to withdraw from class with a grade of "W" is Monday, March 26. After this date, the Dean's Office will automatically assign the grade of "WF" when a student withdraws from the course (except for cases in which the student is hospitalized or encounters some very serious difficulty). **NOTE:** In regard to advice concerning a decision to withdraw (or not) from CHEM 222, each student will meet briefly with the instructor sometime after the second hour exam (but prior to March 26) to discuss his/her progress in the course. If you have taken neither of the two tests given in the course at this stage of the semester, you are strongly advised to withdraw from the class.

In order to review material pertinent to each of the hour exams, the discussion section on Tuesday, February 14, March 13, and April 17 will be used to work problems from exams given in this course in previous years.

**Textbooks:**

- |              |  |
|--------------|--|
| Lecture:     | <u>Organic Chemistry: Structure and Function</u> , Sixth Edition, by Vollhardt and Schore.                         |
| Recommended: | A copy of the study guide and solutions manual for Vollhardt's and Schore's textbook (available at the bookstore). |
| Laboratory:  | The same paperback used by students in CHEM 226 --- “Catalyst Lab Manual”  |

In order to assist you in characterizing the organic compounds you prepare in lab, you may also want to purchase a copy of the following paperback: “Introduction to

Organic Spectroscopy” (Oxford Chemistry Primers, No. 43), by L.M. Harwood, T.D.W. Claridge, and D.W. Claridge (Oxford University Press, 1997).

Supplementary Textbooks:

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

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

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

Organic Chemistry, by L. G. Wade, Jr., Seventh Edition (Pearson Prentice  
Hall, 2010).