Chemistry 25b
Organic Chemistry Lecture
Brandeis University

Syllabus, Spring 2014

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Phone: 736-2574

SSG Leaders:
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Course Description:
Whereas 25a taught you mostly about the structure of organic molecules, and a little about how they react, 25b will deal primarily with reactions. An appropriate analogy is that 25a taught you how to walk; now 25b will teach you how to dance. By learning about molecular properties in 25a, you prepared yourselves to understand how simple reactions could take place. Now we will learn about more complex reactions, and sequences of reactions which have great beauty and huge overall consequences in biology, medicine and industry.

As an example, almost everything that occurs in the origin or cure of disease, for instance, boils down to organic reactions. In order to develop treatments for disease, pharmaceutical scientists design drugs to stimulate the desired reactions and shut down the undesired ones. In order to develop new drugs, or even understand how existing drugs work, it is thus necessary to understand organic reactions. We will begin with carbonyl reactions (Chpt 16-18), then move to aromatics (19) and heteroaromatics (20), then biomolecules such as carbohydrates (21) and peptides/proteins (22) and tentatively end with special topics such as vitamins (24) and drugs.

Learning Goals:
1. To learn how organic functional groups react, in a conceptually connected framework which minimizes the need for memorization
2. To be able to predict reactivity of unfamiliar but conceptually related functional groups.
3. To connect these reactions with processes which occur in biology, medicine and manufacturing.

Prerequisite:
C- or better in 25a or the equivalent. 25b builds heavily on the details of 25a, just as French II builds on French I. If your grade in 25a was a B- or lower, it is strongly recommended that you review that material completely before the second week of this semester.
Class Schedule:

Lectures: Mon, Wed, Thurs 11:00 – 11:50pm in Gerstenzang 123. One lecture will be held during the first Tuesday night recitation slot from 6:30-7:50.

Structured Study Groups (SSG): Tues 6:30 – 7:50 pm in several locations (Honors SSG ends at 8:30 instead). On the first Tuesday night (Jan 14th) we will have lecture in Gzang 123 rather than an SSG. Subsequently, SSGs will be held in Rosenstiel 118 (Abrams-Chiu, led by X. Zhang), Golding 101 (Choi-Holloman, led by B. Goldman), Abelson 131 (Hong-Ma, led by A. Schluger), Schwartz 106 (Magade-Styslinger, led by H. Stolyar), SSC_GL14 (Swenson-Zhu, led by J. Tang) and SSC_LL16 (Honors A–Z, led by N. Shammay).

You must attend all lectures and SSG Sessions. Quizzes will be given during SSG Sessions (described later in this syllabus). Some Tuesday evening sessions will be examinations rather than SSGs. The class will be split between Gerstenzang 123 and other classrooms for exams (Abelson 131, Schwartz 106).

Office Hours:
Dr. Krauss (12:00-2:00) Mon and Wed, or by appointment, in Edison-Lecks 226, across from Chem Office
SSG Leaders (Mon 6:30-9:30pm, Volen 119) (Honors: 8:30-9:30pm, Volen 106)

I am extremely excited about answering your questions during office hours. One-on-one interaction is my favorite part of teaching chemistry. However, please come to office hours with specific questions.

Required Materials:
Molecular Model Kit (any kit is fine).
The Bookstore sells these three required items in a package.
The 6th Edition of Bruice will NOT be sufficient for this course. You must have the 7th.

Web Resources:
LATTE Course Website: http://latte.brandeis.edu

Course Handouts:
All available on LATTE

Credit and Grading:
Grades will be distributed as follows:
7 SSGs (lowest 2 of 9 dropped) 15%
3 Examinations 50%
Final Exam 35%
Course grades are determined based on the class average (typically set between a B or B-) and student distributions around the average.

Examination dates:
Exams always 6:30-8:30 pm. Exam 1 (Feb 11), Exam 2 (Mar 18), Exam 3 (April 29)
Final Exam (9:15 am on May 7th (tentatively scheduled by registrar for Block D))

Quizzes:
- Quizzes will be given during each SSG. Part of the SSG grade will also be based on completion of pre-quizzes and SSG Project assignments, which must both be handed in at the beginning of each SSG. If a student is more than 5 minutes late to SSG, s/he will receive a zero grade for the pre-quiz and SSG Project assignment.

No Makeups:
There are no makeups for quizzes or exams, as this compromises the confidentiality and statistical validity of exam materials. If you arrive late, you must complete the exam within the time allotted. If you have a documented medical excuse or conflicting exam in another class, you can be “excused”, meaning that your course grade will be based on the average of all the other exams and quizzes in the semester. Varsity athletes with unavoidable travel absences for competition purposes may take their exams during their absence from campus, if it is possible to take the exam at exactly the scheduled time, under the supervision of their Brandeis-employed athletic coach. A similar arrangement can not be made for student-run groups which do not have a Brandeis faculty member available and willing to proctor the exam.

Regrades:
Any regrades must be submitted in writing to Dr. Krauss within 1 week after the graded document is returned. Note: the entire document will be regraded; I will correct instances in which graders awarded too many points, as well as too few points. The goal of regrades is to improve the accuracy and consistency of grading, not to increase total points. Thus your total score may go up or down in a regrade. Graded exams will be scanned before they are handed back to the class.

Structured Study Group (SSG) Sessions:
SSGs will provide an opportunity for students to learn in a structured environment using strategies of team learning. The class will be divided into five groups, alphabetically by last name, with an additional group for honors. SSG Leaders are carefully chosen students who have previously completed organic chemistry and are devoted to helping new students achieve success in the course.
- Tues 6:30 – 7:50pm except exam days (and Jan 14th will be a lecture in Gzang 123).
- Attendance is required.
- The format is:
  6:30 pre-quiz hand-in
  6:30-7:00 pre-quiz group discussions
  7:00-7:10 TA-led discussion
  7:10-7:50 quiz
• Pre-quizzes must be completed prior to the SSG and handed in at the beginning of the session. Students who are more than 5 minutes late to section will receive a zero grade for this portion.
• After handing in the pre-quiz, students will be given a blank copy of the pre-quiz and break up into groups of 4 to discuss and prepare a collectively answered copy which will be handed in.
• Any additional time will be spent reviewing questions about other topics.

Honors Option:
Chemistry 25 Section 2 is an honors option of organic chemistry. Lecture, exams, and quizzes are the same as in Section 1, however the honors option involves additional time at the end of the weekly SSG to cover an additional assignment. This work is not "extra credit", but rather constitutes additional tasks for the honors option of the course. Students electing Section 2 will receive the description "Honors Organic Chemistry" on their transcript.

Interested students not already enrolled in this option should email Dr. Pontrello immediately to obtain a signature. Registration is finalized during the first week.

Students will be allowed to drop the honors option (switch from Section 2 to Section 1) until the Drop deadline (March 8).
• Tues 6:30 – 8:30pm except exam days (except Jan 14th will be a lecture in Gzang 123).
• Attendance is required.
• From 6:30-7:50, SSG will be structured as in Section 1.
• After 7:50, weekly Honors homework assignments will be peer reviewed during SSG and graded as Outstanding (O), Satisfactory (S), or Unsatisfactory (U). An O and U average to two S grades. The overall course grade will be decreased by a third of a letter grade (for example, B+ to B) for students who have not completed all the assignments and/or for those who receive more than two Unsatisfactory grades (after all grades are averaged at the end).
• A group project will be completed in the last several SSGs of the course.

Student Disabilities:
If you are a student with a documented disability on record at Brandeis University, and if you wish to request a reasonable accommodation for this class, please see Dr. Krauss immediately. Please keep in mind that reasonable accommodations are not provided retroactively.

Academic Integrity:
Each student in this course is expected to abide by the Brandeis University Student Development and Conduct (http://www.brandeis.edu/studentaffairs/sdc) Handbook on Rights and Responsibilities, with particular emphasis on section 4. Any work submitted by a student in this course for academic credit will be the student’s own work.

Cell Phone/Laptop/WMD policy
Using a cell phone, laptop or WMD (Wireless Mobile Device) to e-mail, text, shop, or otherwise surf the web is disrespectful to your fellow students and to me. Use of these devices is
prohibited. A rare exception is if you use devices exclusively to take hand-written electronic notes. However, if you plan to do this, you must come see me first and e-mail me the notes you take at the end of each class.

**Suggestions for Success in this Course:**

Read the material in the book *before* it is covered in class. I do my best to prepare clear lectures, but you will be much better able to understand and retain lecture information if you have some familiarity with the topic from prior reading.

Put in the time. Some people find this course very difficult; you should spend close to 2 hours/day to learn the material. You will also retain information much better if you study every day rather than spending long blocks of time once a week.

Understand first, but then practice and memorize. Organic chemistry has some aspects in common with language. Even if you easily understand why a simple reaction works, this information needs to be instantly at your fingertips because many harder concepts and exam questions are combinations of many simpler reaction steps. You will have trouble on exams if you have to reinvent the wheel to answer each question. In studying, write out reaction mechanisms repeatedly until you can do them fast, without straining to remember. This way, you be able to see the “big picture”, the flow of steps, and be able to draw connections between different types of mechanisms. Again, this is like in a language class: if you have to strain to remember each vocabulary word, you will never speak meaningful sentences, let alone write paragraphs. That said, I do not advocate routine memorization of facts that seem meaningless; you have to understand them first.

Review material regularly. 25b builds heavily on basic knowledge from 25a. If your understanding of the 25a material is weak, you will be starting with a handicap and should reserve even more time to work on this course. Accordingly, you must review and retain your mastery of material from the beginning of 25b throughout the course. As with a language course, you can’t forget what you learned early in the course and expect to do well later.

*After* reading the chapter, do problems as early and often as possible, and do not refer to the answer guide until you have formulated an answer independently and with complete conviction. If you are wrong, looking up the answer will be a shocking and memorable learning experience.
## Calendar:

<table>
<thead>
<tr>
<th>Mon</th>
<th>Tues(Eve)</th>
<th>Wed</th>
<th>Thurs</th>
<th>Tentative Topics</th>
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<tbody>
<tr>
<td><strong>Jan</strong></td>
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<tr>
<td>13 Lec</td>
<td>14 Lec</td>
<td>15 Lec</td>
<td>16 Lec</td>
<td>Carboxylic Acid Derivatives Ch 16</td>
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<tr>
<td>20 MLK: No class</td>
<td>21 (SSG1)</td>
<td>22 Lec</td>
<td>23 Lec</td>
<td>Ch 16 / Aldehydes/Ketones Ch 17</td>
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<td>27 Lec (add deadline)</td>
<td>28 (SSG2)</td>
<td>29 Lec</td>
<td>30 Lec</td>
<td>Aldehydes/Ketones/1,4-Addition Ch 17 and Li/Mg/Cu reagents, Ch. 12.1-3</td>
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<td><strong>Feb</strong></td>
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<td>3 Lec</td>
<td>4 (SSG3)</td>
<td>5 Lec</td>
<td>6 Lec</td>
<td>Ch 17 / Simplest $\alpha$-carbon Rxns, Ch 18</td>
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<tr>
<td>10 Lec</td>
<td>11 Exam 1</td>
<td>12 Lec</td>
<td>13 Lec</td>
<td>Aldol Condensations Ch 18</td>
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<td>18 no class</td>
<td>19 no class</td>
<td>20 no class</td>
<td>21 no class</td>
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<td><strong>Feb 24 Lec</strong></td>
<td>25 (SSG4)</td>
<td>26 Lec</td>
<td>27 Lec</td>
<td>Claisen Condensations Ch 18, Electrophilic Substitution Ch 19</td>
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<td><strong>Mar</strong></td>
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<td>3 Lec (last day to drop w/out W)</td>
<td>4 (SSG5)</td>
<td>5 Lec</td>
<td>6 Lec</td>
<td>Electrophilic Subst. Ch 19, including directing effects</td>
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<td>10 Lec</td>
<td>11 (SSG6)</td>
<td>12 Lec</td>
<td>13 Lec</td>
<td>Nucleophilic Subst. and other Aromatic Chemistry, Ch 19, Pd couplings, Ch 12.4</td>
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<td>17 Lec</td>
<td>18 Exam 2</td>
<td>19 Lec</td>
<td>20 Lec</td>
<td>Amines and Heterocyclic Aromatics Ch 20</td>
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<td>24 Lec</td>
<td>25 (SSG7)</td>
<td>26 Lec</td>
<td>27 Lec</td>
<td>Carbohydrates Ch 21</td>
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<td>31 Lec (last day to drop with W)</td>
<td>1 (SSG8)</td>
<td>2 Lec</td>
<td>3 Lec</td>
<td>Ch 21 / Peptides/Proteins Ch 22</td>
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<td><strong>Apr</strong></td>
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<tr>
<td>7 Lec</td>
<td>8 (SSG9)</td>
<td>9 Lec</td>
<td>10 Lec</td>
<td>Peptides/Proteins Ch 22</td>
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<td>15 no class</td>
<td>16 no class</td>
<td>17 no class</td>
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<td>21 no class</td>
<td>22 no class</td>
<td>23 Lec</td>
<td>24 Lec</td>
<td>Vitamin Chemistry Ch 24</td>
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<tr>
<td>28 Lec</td>
<td>29 Exam 3</td>
<td>30 no class</td>
<td>May 1 no class</td>
<td>Drugs, Ch 31</td>
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