

ORGANIC CHEMISTRY I Fall 2013 Syllabus
Ingersoll 2310 (Tue/ Thurs from 9:30-10:45)

General Information

Lecturer: Dr. Ryan Murelli
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Office Hours: Tues 11-12:00, Thurs 11-12:00 (437 NE)
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* If you get my voice mail, send an email. I do not check my voicemail messages often.

Statement of Course Goals:

The goal of the lecture component of Organic Chemistry I is to introduce students to fundamental concepts of organic chemistry. By the end of the semester, a successful student will:

- 1) *Have a firm grasp on the language of organic chemistry*
- 2) *Be able to successfully think about and explain chemical reactions through illustration of mechanisms.*
- 3) *Be knowledgeable of chemical reactions and be able to plan multi-step syntheses employing them*
- 4) *Be able to interpret spectroscopy and assign chemical structures using spectroscopic data*

Required Purchases For Lecture:

1. Organic Chemistry, 6th Edition by W. Brown, C.S. Foote, B.L. Iverson, E. Anslyn
 - a. Assignments are set for 6th Edition. 5th Edition follows very closely.
2. Molecular Modeling Set (Highly Recommended)

Recommended Purchases For Lecture & Lab:

1. Solutions Manual for 5th or 6th Edition of the Textbook, ISBN 0-495-38870-X

Resources for Students:

1. Professor Horowitz's Peer-Led Tutor Sessions
 - a. Thursdays 12:30-2, 0311 Ingersoll. Email Prof. Horowitz for more details - ghorowitz@brooklyn.cuny.edu
2. Material on my website (<http://userhome.brooklyn.cuny.edu/rpmurelli/course.html>)
 - a. Recitation handouts
 - b. Old Exams and Quizzes*
 - c. Some Powerpoint slides
 - d. POSSIBLY lecture videos**
 - e. Some links

**You should try to use old quizzes and exams in exam and quiz-like atmospheres (timed, no books) to gauge where you are in your understanding of the material.*

*** I am going to attempt to video my lectures this semester and put them on my website. This is NOT meant to be an alternative to the class, but an option in case you miss a class, or an option to "re-watch" in case you missed something. If this leads to low turnout in the lecture, I may stop doing it.*

3. Highly recommended tutorial/supplement
 - a. <http://masterorganicchemistry.com/organic-1/>
4. Library: Textbook, Solutions Manual & Molecular Models are on Reserve
5. Practice Problems on Prof. Horowitz' Website: <http://userhome.brooklyn.cuny.edu/ghorowitz/>
6. Online Video Tutorials: <http://www.youtube.com/user/freelanceteach>
7. Online Tutorials: <http://ochem.jsd.claremont.edu/tutorials.htm#>
8. Animations of Reaction Mechanisms: www.chemtube3d.com
9. Supplementary Problems Online:
<http://www.cem.msu.edu/~reusch/VirtualText/Questions/problems.htm>
<http://www.mc.maricopa.edu/~minger/CHM235.htm>, <http://www.utdallas.edu/~scortes/ochem/>
10. Prof. Horowitz Website:
<http://userhome.brooklyn.cuny.edu/ghorowitz/index.htm>

How to Succeed In Organic Chemistry:

Organic Chemistry is notoriously difficult class for many students. I do not know how to get everyone to succeed, but I can offer the following advice that I think can be useful for some (hopefully most).

1. The course will be much easier with an understanding of reaction mechanisms, and impossible without one. Despite my attempts at drilling this home to students, it remains a significant challenge. I want you to all start learning arrow pushing/mechanisms as soon as possible, and try to get it to be second nature to you. Here are some online video resources to "get ahead" I found that I thought were nice:

Khan Academy

(www.khanacademy.org/science/organic-chemistry/alkenes-alkynes/alkene-reactions/v/introduction-to-reaction-mechanisms)

IUPUI Organic Chemistry

(<http://www.youtube.com/watch?v=snz-3a4ux8c>)

Prof. Jonathan Gough (Long Island University)

(<http://www.youtube.com/watch?v=0JFyMYTKqCY>, <http://www.youtube.com/watch?v=LwFOPSItooc>)

2. Set aside 10-15 hours per week of study time for the lecture component of this course. **More time may be required, especially during first month or so.**
3. Attend class religiously. I will try to put lecture videos online. Watch until you understand EVERYTHING.
4. Figures >>> Text. I cannot communicate research that well with my organic chemistry colleagues without a paper and pencil in hand. The reason is that organic chemistry is best understood with figures, structures, etc. When reading the textbook, I would suggest that you make the understanding of the textbook figures your primary objective, and simply use the text to help you in that pursuit. It is my opinion that reading the textbook from cover to cover the way you normally would read a book is not an efficient use of your time.
5. Along those lines, what is THE MOST valuable use of your time will be problem solving:
 - Spend the majority of your study time doing problems, not reading.
 - Do the assigned textbook problems plus problems posted on the Murelli and Horowitz websites.
 - Practice each topic until you have mastered it. Don't stop just because you have completed the assigned problems.
 - **Study with a partner or in a group.** Organic Chemistry cannot be mastered alone.
 - Don't be afraid to ask for help. Get help immediately if you get stuck.

HOWEVER!!!! Practicing problems without knowing what you are doing is likely to lead to bad habits and be a waste of your time or worse. If you begin to practice problems just for the sake of practicing problems and you aren't learning anything, or you don't feel like you aren't understanding why you are doing what you are doing, you need to take a step back. THIS is why it is important that you make time for yourself to study Organic Chemistry for as much as is needed. Also, make sure you are getting feedback on your problems from someone that knows what they are doing.

Course Grade Breakdown:

Lecture/Recitation

Quizzes 25%

Exam I 17.5%

Exam II 17.5%

Final Exam 35%

Recitation Attendance 5%

KEY DATES

Dates of Quizzes and Exams

Quiz 1* - 9/16-9/20
Quiz 2 - 9/30-10/4
Exam 1 - 10/8
Quiz 3 - 10/28-11/1
Quiz 4 - 11/11-11/15
Exam 2 - 11/19
Quiz 5 - 12/9-12/13
Final Exam - Fri 12/20

Administrative Dates

Last day to add a course - Tue 9/10
Last day to file pass/fail application - Tue 9/10
Last day to drop a course without a W - Tue 9/17
Last day to file for fall graduation - Tue 10/15
Last day to resolve spring 2013 and summer 2013 ABS and incomplete grades - Thu 12/5
Last day to withdraw from a course with a W (non-penalty) grade - Fri 11/8

** Quizzes will be held at your respective recitation. While with permission from the recitation instructor you are welcome to go to additional recitation sections to supplement your studies, you may not show up to another recitation section on the day a quiz is being held. In the event that you know or anticipate that you will be missing a quiz due to scheduling conflicts (ie religious holiday, family event, bayou adventure), you may ask for permission to take a quiz at one of the other recitation sections. **This must be done WITHIN 24 HOURS of the quiz, and any request made after then will not be granted.** Everyone's lowest quiz grade will be dropped to help offset that bad day where an unexpected flat tire, delayed train, or alien abduction made you miss the quiz.*

COURSE POLICIES AND PROCEDURES

Academic Integrity:

Academic dishonesty of any type, including cheating and plagiarism, is unacceptable at Brooklyn College. Cheating is any misrepresentation in academic work. Plagiarism is the representation of another person's work, words, or ideas as your own. Students should consult the Brooklyn College Student Handbook for a fuller, more specific discussion of related academic integrity standards. Academic dishonesty is punishable by failure of the "test, examination, term paper, or other assignment on which cheating occurred" (Faculty Council, May 18, 1954). In addition, disciplinary proceedings in cases of academic dishonesty may result in penalties of admonition, warning, censure, disciplinary probation, restitution, suspension, expulsion, complaint to civil authorities, or ejection. (Adopted by Policy Council, May 8, 1991.)

Students with Disabilities:

If you have a disability, it is the responsibility of the university to provide you with reasonable accommodations. You should first register with Ms. Stewart-Lovell, the Director of the Student Disability Services Center (718-951-5538). Then please provide me with a copy of your course accommodation form and if necessary please schedule an appointment with me to discuss your specific accommodation needs.

Absence from Examinations:

No make up examinations will be given to students who are absent from lecture examinations or recitation quizzes. Students who miss one of the exams with a valid excuse will be assigned a score for the exam missed on the basis of their performance on the other lecture exam and on the final. A grade of zero for lecture will be given if both lecture exams are missed. In the event of absence from the final exam, students must apply to the Academic Advisement Center for permission to take a make up final examination given during following semester. No make-up final will be given to any student who is failing the course heading into the final.

Re-grade Requests: While we are human, occasionally there is a mistake made on a quiz or exam. You are in your right to request re-grades. There are two ways to do this.

1. For any **BLATANT** mistakes including a right answer marked wrong (ie, you should have received FULL credit), or a number/ adding error: Please show your recitation instructor, and they will make the first approximation judgment call on whether it constitutes a blatant mistake or not. If they do, they will give the

- quiz/exam to me for further evaluation, and if it truly is blatant, I will simply make the change accordingly or otherwise suggest a regrade request form.
2. For any request related to partial credit (ie, if you come to me asking 'shouldn't I get more points for this?!?'), or one that is not deemed to be a blatant mistake by your recitation instructor: Fill out and submit in writing using the standardized regrade request form, which can be found on Professor Horowitz's website (<http://userhome.brooklyn.cuny.edu/ghorowitz/index.htm>). Requests for a re-grade in this fashion will result in the regrading of the entire exam, and you must accept your grade in the event that the grade turns out lower than your initial grade.

Expectations for Recitation:

Students are expected to attend all recitation meetings and to arrive on time. Recitation will be spent working on problem solving. Students are expected to actively participate in this activity. 5 quizzes will be administered throughout the semester. Make-up quizzes will not be allowed for their first missed quiz. In the event that a student misses 2 or more quizzes, make-ups MAY be allowed, but only with valid excuses for all of the missed quizzes.

Recommendation Letters:

If you need or think that you may need a recommendation letter from me at some point in the future, regardless of when you need it, you should email me at the end of the semester to ensure a greater likelihood of accurate personal anecdotes in your letters. In addition, to ensure a stronger letter, you should make a point of coming to my office hours occasionally and participate so that I may know who you are.

COURSE SCHEDULE OF TOPICS

| Topic | Tentative Dates | Reading and Practice Problems (6 th Edition) |
|---|-----------------|---|
| Drawing and Naming Organic Molecules | 8/29, 9/3 | <p>* <u>Lewis Structures</u> - 1.1-1.2 (This should be review from Gen Chem- See problems 1.6, 1.7, 1.20, 1.23, 1.24, 1.26-1.32 and if these are not easy for you, review until they are, and don't move on until it is)</p> <p>* <u>Organic Chemistry Shorthand</u> - 2.1-2.2 Organic shorthand is a critical skill, and it is important that you invest the time until you are comfortable with it. If the book and/or my lecture doesn't make sense, you can find several nice video tutorials online such as "Representing Structures of Organic Molecules" from Khan Academy. This is a skill you should master within the first week.</p> <p>- For some entry problems, see: 2.1, 2.2. For a more thorough exercise, partner up with a friend or friends and come up with problems for one another <u>that include heteroatoms and alkenes/alkynes</u>)</p> <p>* <u>Functional Groups</u> - 1.3, Chapter 5 Intro - I will not specifically discuss this vocabulary in class. Know the following key functional groups (Alcohol, Ether, Amine, Carbonyls (Ketone, Ester, Aldehyde, Carboxylic acid, Amide), Alkene, and Alkyne.</p> <p>* <u>IUPAC</u> - 2.1-2.4, 5.2A, 8.2A, 10.1B, 16.2A-B - IUPAC naming is valuable but not essential for keeping up in the course. I will actually not cover it in detail in class, in part because it would take away time from other aspects that are more critical for you to learn. Spend some time learning IUPAC on your own (~ 3-4 hours) and practice before quiz 1 and exam. Examples of difficulty level of IUPAC questions can be seen on old quiz 1s and exams.</p> |
| Secondary Structures of Organic Molecules | 9/10, 9/12 | Bond Angles, Dipoles, Molecular Orbital/ Valence Bond Theory, and Hybridization - 1.4-1.7 Newman and Chairs - 2.5-2.6 Stereochemistry - 3.1-3.8 |
| Quiz 1 | 9/16-9/20 | Suggested Problems: Start with old Quizzes on my website, and then do: 1.14, 1.15, 1.56, 1.64, 2.3, 2.5, 2.26-2.30, 2.33-2.36, 2.39, 2.51, 3.3, 3.6, 3.14,-3.19, 3.22, 3.25-3.28, 3.30, 3.31, 3.34. |
| Reaction Mechanisms | 9/17 | Resonance Forms - 1.8-1.10 Bronsted Acid/Base - 4.1-4.6 Lewis Acid/Lewis Base - 4.7 |
| Substitution Reactions | 9/19, 9/24 | SN1 and SN2 reactions - 9.1-9.4, 9.9 , Inductive Effect and Hyperconjugation - 6.3A <i>Inductive effect and hyperconjugation is important for understanding stability of cations which is a strong factor in determining SN1 vs. SN2</i> |
| β -elimination | 9/26 | E1 and E2 - 9.5-9.7 Substitution vs. Elimination - 9.8 |

| | | |
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| Quiz 2 | 9/30-10/4 | Suggested Problems: Start with old Quizzes on my website, and then do: 1.16 - 1.19, 1.74, 1.75, 4.2, 4.3, 4.5, 4.8, 4.9-4.17, 4.24, 4.32, 4.33, 4.35, 4.36, 4.41, 4.44, 4.45, 4.48, 9.1-9.9, 9.13, 9.16, 9.20, 9.25, 9.27, 9.28, 9.32, 9.44 |
| Reactions of Alcohols | 10/1 | Promoted by base – 10.3, 10.4, 11.4A Promoted by acid – 10.5A, 10.6, 10.7, 11.4B Conversion into Leaving Groups – 10.5B-10.5D Protection of Alcohols – 11.6 |
| EXAM 1 | 10/8 | 10/3 will be review if time permits |
| Reactions of Alkenes | 10/10, 10/17 | 4.2, 6.2D-F, 6.3A-C, 6.4-6.7 |
| Reactions of Alkynes | 10/22 | 7.4-7.8C, for keto/enol tautomer - 16.9 |
| Synthesis | 10/24, 10/26 | 7.9 |
| Quiz 3 | 10/28-11/1 | Suggested Problems: Start with old Quizzes on my website, and then do: 6.1-6.12, 6.14 – 6.23 (6.13 -6.23 in Ed. 5) , 6.32-6.44 (6.31-6.43 in Ed. 5). 7.3-7.6, 7.8, 7.13, 7.14, 7.20, 7.21 |
| Carbonyls | 10/31, 11/5 | 10.8A-C, 16.3-16.12 (omit 16.5A, B) |
| Organometallic Reactions | 11/7 | Grignard – 15.1A-C Alkyl Lithium – 15.1A, 16.5B Alkyl Cuprates – 15.2A-15.2C, 19.8E |
| Quiz 4 | 11/11- 11/15 | Suggested Problems: Start with old Quizzes on my website, and then do:15.1-15.4, 15.7-15.10, 16.4-16.8, 16.12, 16.18-16.22, 16.32, 16.33, 16.37, 16.46, 16.48, 16.50-16.52, 16.57, 16.72-16.75 (16.72-16.75 in Ed. 5), 8.24-8.26, 8.30 (8.28 in Ed. 5). |
| Radicals | 11/12 | 8.3D-8.8 |
| Exam 2 | 11/19 | 11/14 will be a review if time permits |
| IR/Mass Spec | 11/21, 11/26, | IR Spectroscopy – 12.1-12.3 Mass Spectroscopy – 14.1-14.3 |
| NMR | 12/3 12/5 | Theory – 13.1-13.4 Interpretation – 13.5-13.12 |
| Quiz 5 | 12/9-12/13 | Suggested Problems: Start with old Quizzes on my website, and then do: 13.11, 13.12, 13.16-13.18, 13.20, 13.24, 14.4, 14.24-14.26, 14.31, 14.32 |
| Final Exam Prep | 12/10 | Final Exam is Scheduled for Fri 12/20 |