**ORGANIC CHEMISTRY I SPRING 2012**

**Lecturer**: Dr. Gail Horowitz

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**Office Hours**: Tues 11-12:30, Thurs 11-1 and by appointment,

drop ins are also welcome

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| **Recit/Lab**  **Instructors** | **Fraboni** | **Ghogare** | **Hayes** | **Meck** | **Murelli** |
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| **Office Hrs** | Tues 1-2  357 NE | Wed 2-3  359H NE | Fri 1-2  357 NE | Thurs 12-1  357 NE | Mon 1-3  437 NE |

**Required Purchases For Lecture & Lab:**

1. Organic Chemistry by W. Brown, C.S. Foote, B.L. Iverson, E. (any recent edition of the book is ok)
2. Solutions Manual for Organic Chemistry (any recent edition of the solutions manual is ok)

*~~Buy the e-book at~~* [*~~www.cengagebrain.com~~*](https://outlook.brooklyn.cuny.edu/exchweb/bin/redir.asp?URL=http://www.cengagebrain.com) *~~for only $99 (ISBN # 1111472068) and get an electronic copy of the solutions manual as an upgrade for only $35.~~*

1. Organic Chemistry Laboratory Manual, Custom Published Edition, Cengage Learning. ISBN 1111774692.
2. Molecular Modeling Set
3. Composition Notebook
4. Lock for Lab Drawer

**Resources for Students:**

1. Extra Problem Sessions with Professor Horowitz: Tues 6-7:30 PM, Thurs 1-2:30 PM, 0308 Ingersoll
2. Supplementary Instruction in Learning Center: Times TBA
3. Peer Tutor Available Via Email: [BCorgo1@gmail.com](mailto:BCorgo1@gmail.com)
4. MAPS/NBSSO Student Study Group: Tues & Thurs 12:30-2 PM, 434 New Ingersoll
5. Library: Textbook, Solutions Manual & Molecular Models are on Reserve
6. Practice Problems on my Website: [http://userhome.brooklyn.cuny.edu/ghorowitz/](http://userhome.brooklyn.cuny.edu/ghorowitz/%20)
7. Online Tutorials:

<http://www.youtube.com/user/freelanceteach> <http://www.khanacademy.org/>

[http://ochem.jsd.claremont.edu/tutorials.htm#](http://ochem.jsd.claremont.edu/tutorials.htm)

<http://www.youtube.com/channel/UCGEi3UHuzHKDuMJkf_iRq5g/videos?view>=0

1. Animations of Reaction Mechanisms: [www.chemtube3d.com](file:///C:\Documents%20and%20Settings\Gail%20Horowitz\My%20Documents\Brooklyn%20College\Chemistry%20Department\Chem%2051\Syllabi\www.chemtube3d.com)
2. 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/>

[http://highered.mcgraw-hill.com/classware/selfstudy.do?isbn=0073047872](https://outlook.brooklyn.cuny.edu/exchweb/bin/redir.asp?URL=http://highered.mcgraw-hill.com/classware/selfstudy.do?isbn=0073047872)

1. A Review Book recommended by former students:

Organic Chemistry I as a Second Language by David Klein (can be purchased very cheaply online).

**How to Succeed In Organic Chemistry:**

1. Set aside 10-15 hours per week of study time for the lecture component of this course.
2. Attend class religiously.
3. Skim the textbook before class.
4. Take notes in lecture.
5. Review your lecture notes as soon as you can after class meets.
6. Problem solving is key:

* **Spend the majority (at least 75%) of your study time doing problems, not reading.**
* Do the assigned textbook problems plus problems posted on my website.
* 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.
* Don’t be afraid to ask for help. Get help immediately if you get stuck.

**Course Grade Breakdown:**

*Lecture 55% Recitation 25% Laboratory 20%*

Exam I 25% Quizzes 85% Prelabs & Postlabs 80%

Exam II 25% Attendance 15% Lab Notebook 10%

Final Exam 50% Instructor Evaluation 10%

**LECTURE SCHEDULE**

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| --- | --- | --- |
| **Topic** | **Tentative Dates** | **Assigned Homework from Textbook (Edition 5) and Internet**  **(Also do Advanced Problems from my Website or your Recitation)** |
| Chapter 1 | Jan 31 | 23-25, 27-32, 34, 37, 45, 47, 50-52, 57, 59, 60, 64-65, 67, 71, 72  <http://www.mc.maricopa.edu/~minger/CHM235.htm>  do problems on lewis structures, resonance and formal charges |
| Chapter 2,  Appendix 9 | Feb 2, 7, 9 | 16, 17, 21, 23, 26-28, 30, 32-36, 39, 40, 42, 46, 48- 52, 56, 62-63  <http://www.mc.maricopa.edu/~minger/CHM235.htm>  do problems on nomenclature, bond-line drawings and cyclohexane  <http://www.utdallas.edu/~scortes/ochem/OChem1_Lecture/exercises/ch3_confor_anal.pdf> do all problems  <http://www.cem.msu.edu/~reusch/VirtualText/Questions/problems.htm> do problems 4 & 5 within conformations and stereochem section |
| **Quiz I: Chapter 2** | TBA: Given in Recitation |  |
| Chapter 3 | Feb 14, 16 | 15-20, 22, 24-26, 30-31, 32, 34, 37, 39  <http://www.mc.maricopa.edu/~minger/CHM235.htm>  do problems on stereochemistry  <http://www.cem.msu.edu/~reusch/VirtualText/Questions/problems.htm> do problems 2,6,10,14-19 within conformations and stereochem section  <http://www.utdallas.edu/~scortes/ochem/OChem1_Lecture/exercises/ch5_stereo2.pdf> do part B problems |
| **Last Day to Drop** | Feb 16 |  |
| **Quiz II: Chapter 3** | TBA: Given in Recitation |  |
| Chapter 4 | Feb 23 | 10, 11, 15, 16, 19, 20, 22, 23, 25, 31, 33, 35, 37, 41, 42, 44, 45  <http://www.mc.maricopa.edu/~minger/CHM235.htm>  do both sets of Bronsted Lowry problems |
| Chapter 5 | Feb 28 | 9, 10, 12, 14, 18, 20, 21, 32, 37 |
| Chapter 6,  Appendix 10 of Edition 6 | March 1, 6, 8 | 13, 14, 15-26, 28-30, 32, 33, 37-39, 42-49, 54 |
| Chapter 7 | March 13 | 11, 12, 16 -18, 20 b-e, g-i, 21 c-f, 29 |
| Chapter 8 | March 15 | 10-12, 13, 14-16, 18, 21, 23, 26, ~~28-30,~~ 28-32 |
| **Exam I: Chapters 1-6** | March 20 |  |

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| **Topic** | **Tentative Dates** | **Assigned Homework from Textbook (Edition 5) and Internet**  **(Also do Advanced Problems from my Website or your Recitation)** |
| Chapter 9 | March 22, 27, 29 | 10-18, 20-33, 36-40, 42-60 |
| **Quiz III: Chapter 9** | TBA: Given in Recitation |  |
| Chapter 10 | April 3 | 18, 20-22, 25-29, 31-33, 35-40, 44-46, 48, 50-56 |
| Chapter 11 | April 5 | 10, 12, 13, 15, 17, 20, 21, 23, 24, 25-28, 31, 33, 34, 40, ~~42-44~~, 42-46 |
| Chapter 15  Appendix 11 of Edition 6 | April 17 | Chapter 7: 23-25, ~~31-34~~ 30-34; put chapter 7 assigned problems with chapter 9 instead of chapter 15  Chapter 15: 7-12, ~~16-19,~~ 16-26 |
| **Last Day to Withdraw** | April 19 |  |
| Chapter 16 | April 19, 24, May 1 | 19, 20, 24, 26, 31-33, 37, 39, 42, 43, 45, 46, 48, 51, 52, 54, 58, 66, 70, 72-77 |
| **Exam II: Chapters 7-11, 15** | April 26 |  |
| **Quiz IV:**  **Chapter 16** | TBA: Given in Recitation |  |
| Chapter 13 | May 3, 8 | 11, 13, 15-20 (omit 17g, 17h), 23-25, 28  extra problems available at: http://www.chem.ucla.edu/~webspectra/ |
| Chapter 12 | May 10 | 5-11 |
| Chapter 14 | May 15 | 6, 8, 11, 14, 16, 20, 24-30 |
| **Quiz V:**  **Chapter 13** | May 15: Given in Lecture |  |
| **Final Examination: Cumulative** | May 17 8:00 AM |  |

**LABORATORY SCHEDULE**

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| --- | --- | --- | --- | --- | --- | --- |
| **Lab** | | **Experiment** | **Required**  **Reading** | **Mon** | **Wed** | **Fri** |
| 1 | | Checkin, Solid Unknown, Liquid Unknown  Experiments 2C & 6; Techniques 1, 9 & 13A | pgs. 16, 51-54, 79-95, 135-143, 203-206 | 1/30 | 2/1 | 1/27 |
| 2 | | Solubility Experiment  Experiments 1A, 1B & 1C; Technique 10 | 1-4,  147-153 | 2/6 | 2/8 | 2/3 |
| 3 | | Extraction of Neutral Unknown  Experiment 3D, Technique 12 | 28-31, 177-185, 191-198 | **Tues**  **2/21** | 2/15 | 2/10 |
| 4 | | Recrystallization Sulfanilamide & Fluorene  Experiments 2A & 2B; Techiques 8 & 11 | 11-16, 119-127, 157-176 | 2/27 | 2/22 | 2/17 |
| 5 | | TLC and Column Chromatography  Experiment 4D; Techniques 19 & 20 | 41-43, 249-287 | 3/5 | 2/29 | 2/24 |
| 6 | Electronic Structure of Molecules | | Handout | **A: 3/12**  **D: 3/12**  **G: 3/19** | **B: 3/7**  **C: 3/14** | 3/2 |
| 7 | Simple & Fractional Distillation:  Unknown Mixture  Experiment 5; Techniques 7.1A, 14 & 15 | | 45-48, 97-99, 215-221, 227-238 | **A: 3/19**  **D: 3/19**  **G: 3/12** | **B: 3/14**  **C: 3/7** | 3/9 |
| 8 | Nucleophilic Substitution | | Handout | 3/26 | 3/21 | 3/16 |
| 9 | Elimination of Methylcyclohexanol  Experiment 24 | | 63-66 | 4/2 | 3/28 | 3/23 |
| 10 – 11 | Oxidation of an Unknown Alcohol & Preparation of Derivatives | | Handout | 4/16, 4/23 | 4/4, 4/18 | 3/30, 4/20 |
| 12 | Grignard Reaction: Triphenylmethanol  Experiment 36, 36A; Techniques 7.5 & 7.6 | | 67-75, 104-107 | 4/30 | 4/25 | 4/27 |
| 13 | Finish Grignard, Acetal Formation | | Handout | 5/7 | 5/2 | 5/4 |
| 14 | Check-out: No Experimental Work  **SUBMIT LABORATORY NOTEBOOK** | | NA | 5/14 | 5/9 | 5/11 |

Please note that laboratory period 6 takes place at the learning center.

**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:**

If you miss an exam, you must notify your instructor of your absence in writing within 24 hours of having missed the exam. No make up examinations will be given to students who are absent from lecture examinations. Students who miss one exam **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 makeup finals will be given to students whose overall course average before the final exam is less than 50%.

**Regrade Policy:**

Any student wishing a re-evaluation of an exam question must submit a signed, regrade request form (available on my website) within two weeks of the return of the quiz or examination. A scanned in electronic copy of the quiz or exam will be utilized to re-evaluate your paper.

**Expectations for Recitation:**

Students are expected to attend all class meetings and to arrive on time. Recitation will be spent working on problem solving. Students are expected to actively participate in this activity. A minimum of five quizzes will be administered over the course of the semester. The lowest score of the five will be dropped. Any missed quiz (regardless of the reason) will be assigned a score of zero.

**Laboratory Instructions and Regulations:**

Safety is number 1 priority in lab. You will be provided with an approved pair of safety goggles. **Wearing goggles at all times in the laboratory is mandatory.** If you are caught not wearing goggles in the lab, you will be asked to leave and you won’t be allowed back for that session.

During the first laboratory session, you will receive 2 copies of a hand-out of safety rules. One is for you to keep and the other one is for you to sign and to return to your lab instructor. You must read, understand and agree to abide by these rules if you want to take the course.

Please follow the instructions regarding check-in and check-out given by the senior college laboratory technician, Ms. Anna Belyayeva. Make sure that you clean your glassware and bench space everyday and that you return all your glassware and equipment to your laboratory drawer before you leave. Report any missing or broken items to Ms. Belyayeva.

If you miss a lab, please follow the following procedure in order to makeup the experiment. Pick up a makeup form from the stock room and ask your instructor to sign it. Check with the makeup instructor to make sure there is room for you to work in his or her laboratory. Have the makeup instructor sign the form so that credit can be given to you for having completed the experiment.

**New Makeup Rule:**

Please always try to do a makeup with another lab section that is doing the same experiment that you missed.  However, if you cannot do this, you must provide 24 hours written notice to me regarding your need to makeup an experiment.  Because the stockroom is understaffed, they cannot setup a experiment for you at the last minute.  So please **email** me in advance, letting me know your name, what section you wish to attend and the exact name of the experiment you wish to makeup.

**LABORATORY REPORTS AND NOTEBOOKS**

*You will be required to submit a prelab and postlab for each experiment or set of experiments.*

*You will also be required to keep a laboratory notebook which you will turn in at the end of the semester. The instructions below describe what should be included in your prelab, postlab and notebook.*

**Prelabs 10 pts**

**Table of Chemicals Used (2 pts)**

*The table of chemicals should list all known chemicals that will be used, including solvents. List any hazards associated with each chemical. If a chemical reaction is conducted, you must also report the molecular weight, density, grams and moles for each chemical involved in the reaction.*

**Procedure (3 pts)**

*The procedure should be concise. A typical procedure should be approximately 5-10 sentences long.*

**Pre-lab Question (5 pts)**

*Each pre-lab will have a prelab question. This will test your understanding of the experiments BEFORE you actually perform the experiment.*

**Laboratory Notebook**

*You must purchase a composition style notebook (a hard bound book, not a spiral). All data collected in the laboratory must be recorded directly in this notebook. Each experiment’s data should be recorded on a separate page. Each page should be headed with the title of the experiment and the date in which the data was collected.*

**Postlabs 10 pts**

**Observations (2 pts)**

*List important observations that were made during the lab.*

**Data (3 pts)**

*List any data that you have obtained and report % recovery and/or % yield when applicable. Show graphs of data where applicable.*

**Post-lab Question (5 pts)**

*One post-laboratory question will help guide you to critically evaluate the laboratory you just performed. It should be concise and to the point, and should rely upon observations that you have made when necessary.*

**Pre-and Post lab Questions**

Lab 1 – Boiling Points and Melting Points

**No pre-lab required.**

**Post-lab (due week 2) -** *Draw the chemical structure of acetylsalicylic acid (aspirin). What functional groups does it have? Where would they show up in an IR spectrum?*

**Bonus Question (1 pt) –** *What were your unknowns?*

Lab 2 – Solubility

**Pre-lab (due week 2)** – *Oil and water do not mix - they are not soluble in one another. Why is this the case?*

**Post-lab (due week 3) -** *Compare the solubility results of biphenyl and benzophenone. Account for any differences observed. Your explanation should include an explanation of intermolecular forces. Explain the solubility results you observed for the alcohols in part B.*

Lab 3 – Aqueous Extraction

**Pre-lab (due week 3)** – *Using structures (e.g. RC=OR’ and RCO2H), describe the process of aqueous extraction. What is the fate of the acid when the solution is treated with aqueous NaOH and where does the acid end up?*

**Post-lab (due week 4) -** *Was aqueous extraction effective at purifying your neutral compound? Use your data and observations to support your claims. Be sure to discuss purity and yield.*

**Bonus Question (1 pt) –** *What is your unknown?*

Lab 4 – Recrystallization and Melting Point

**Pre-lab (due week 4)** – *Describe an ideal solvent system for recrystallization. Why is it ideal?*

**Post-lab (due week 6) –** *Were you successful at purifying fluorene and sulfanilamide? Use your data and observations to support your claim.*

Lab 5 – Column Chromatography

**Pre-lab (due week 5) –** *What are the properties of fluorene and fluorenone that allows chromatography to separate them? Which do you expect to come off first and why?*

**Post-lab (due week 6) –** *Were you successful at separating fluorene and fluorenone? Use your data and observations to support your claim.*

Lab 6 – Computational Modeling

**No prelab is required for this lab. Turn in your completed packet week 7.**

Lab 7 - Distillation

**Pre-lab (due week 7)-***Why is fractional distillation more efficient at purifying compounds than simple distillation?*

**Post-lab (due week 8)-** *What observations were made that differed between fractional and simple distillation? How do these help support the notion that fractional distillation is more efficient at separating liquids?*

**Bonus Question (1 pt) –** *What were your unknowns?*

Lab 8 – Preparation of bromobutane

**Pre-lab (due week 8)** - *Show the mechanism of bromobutane synthesis.*

**Post-lab (due week 9) –** *Were you successful at synthesizing bromobutane? How was your yield? If your yield was poor, how do you think you could have improved it if you repeated the experiment?*

Lab 9 – Elimination of Methylcyclohexanol

**Pre-lab (due week 9**) **–** *Show the mechanism for the synthesis you will be performing.*

**Post-lab (due week 10)** – *Do you think your synthesis was successful? Describe the alkene tests that you performed. Show structures to justify your answer.*

Labs 10 and 11 – Alcohol Oxidation

**Pre-lab (due week 10)**

Explain how the Iodoform test and derivative preparations will be utilized to identify your unknown.

**Post-lab (due week 13)** –*Where you successful at oxidizing the alcohol to a ketone? Was your yield good?*

**Bonus Question (1 pt) –** *What is your unknown?*

Lab 12 – Grignard

**Pre-lab (due week 12)** – *Show a mechanism for the synthesis that you will be performing. Why do you think it is important to keep the system dry?*

**Post-lab (due week 14**) – *Discuss your yield and purity. Do you think that the reaction was successful?*

Lab 13 – Acetal Formation

**Pre-lab (due week 13)** – *Show a mechanism for the synthesis that you will be performing.*

**Post-lab (due week 14**) – *Discuss your yield and purity. Do you think that the reaction was successful?*