

# ORGANIC CHEMISTRY LAB II

## Spring 2014 Syllabus

### General Information

**Lab Instructor/Section:** YOUR NAME/Section  
**Office:** your preferred place  
**Email:** your email@brooklyn.cuny.edu  
**Office Hours:** Your preferred time

**Lab Coordinator:** Prof. Stacey Brenner-Moyer  
**Office:** 345 New Ingersoll  
**Email:** SBrenner@brooklyn.cuny.edu  
**Office Hours:** Mon 11-1:00, Wed 11-12:00 (345 NE)

### Statement of Course Goals:

*The goal of the lab component of Organic Chemistry II is build upon the concepts learned in Organic Chemistry I lab, and also to learn critical thinking and independent problem solving skills.*

### Required Purchases For Lab:

1. Organic Chemistry II Laboratory Manual (Pavia)
2. Composition Notebook
3. Lock for Lab Drawer
4. Paper Towels
5. Soap

### Highly Recommended

Lab coat (ask in stock room for names of some vendors)

### Course Grade Breakdown:

Safety quiz - 10%  
Pre-Lab - 6%  
Lab Notebook - 6%  
Homework - 18%  
Unknown - 36%  
NMR interp - 6%  
Lab report - 18%

*\*The safety quiz will be taken immediately following the safety video during lab, and a score of 80% must be achieved to continue in the lab. In the event that a student fails the safety quiz, they must rewatch the safety video and take a second safety quiz, held **Tuesday February 4** during common hours. The location of this quiz TBD.*

## **Administrative Dates**

**Last day to add a course** – Tuesday February 4 (ON LINE with department permission)

**Last day to file pass/fail application** – Friday February 7

**Last day to drop a course without a grade** – Tuesday February 18

**Last day to file for spring graduation** – Friday March 14

**Last day to resolve fall 2013 incomplete grades for fall 2013 and intersession 2014** – Thursday April 24

**Last day to withdraw from a course with a W (non-penalty) grade** – Thursday April 24

## **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.

## **COURSE SCHEDULE OF TOPICS**

### **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. You will receive a score of 0 for that day's prelab and notebook check.

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 (with solvent if necessary) 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 make up 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.

You should not run heating devices (hotplates, heating mantles and melting point devices) more than more than the midpoint on the controller. When the controllers are run and left in the maximum position the units over heat. This causes thermometers to crack and mercury spills on the bench and floors. Individuals can suffer bad burns by running heating mantles with controllers set on high or using a heating mantle without a controller.

You do need to learn from your instructor the proper way lubricate your glass fittings to avoid breakage.

**Laboratory Breakage.** In some schools, a laboratory fee is charged to everyone. The department's practice is to charge you only for the replacement cost of any items you lose or break. After check out, a bill will be prepared which you may pay at the bursar's office the following semester.

**NOTE:** If you have checked in for any lab course **you must check out** even if you only attend class for one or two weeks before dropping the course. Students who fail to check out will be charged a fee of **\$50** plus the cost missing or broken equipment. Students who drop a course must go to the stockroom to check out as soon as possible.

## Lab Reading and Assignments

### Schedule:

Week	Experiment	Reading	Assignments Due
<b>1</b> (Week of Jan 27)	Check-in/ Safety Video and Quiz	None	none
<b>2</b> (Week of Feb 3)	Michael/Aldol Condensation	7	Michael/Aldol Pre-lab (week 2)
<b>3</b> (Week of Feb 10)	Nitration of Methyl Benzoate	1	Nitration Pre-lab (week 3) Michael/Aldol Lab Questions (due week 6)
<b>4&amp;5</b> (Weeks of Feb 17 and 24)	Benzoin to Hexaphenylbenzene	Handout Given out week 3	Benzoin Pre-Lab (Week 4) Nitration Lab Questions (due week 8)
<b>6-11</b> (Weeks of Mar 3, 10, 17, 24, 31 and Apr 7)* <b>13-16</b> (Weeks of Apr 23, 28 and May 5 and 12)	Identification of Unknowns (3 unknowns) <sup>1</sup> H NMR of your first unknown will be in week 8	13 and NMR Handout	Unknown Pre-Lab (due week 6) Benzoin Lab Questions (due week 10) Lab report unknown 1 (due week 9) Lab report unknown 2 (due week 14)
<b>16</b> (Week of May 16)	Check-Out	None	Lab Report Unknown 3 (due week 16) Turn in laboratory notebook

\*April 14-22 No lab, Spring Break

### \*\*NMR of unknowns

Tuesday March 25<sup>th</sup>, 2:15—6:05pm (Horowitz and Mollica)

Friday March 28<sup>th</sup>, 9:00am—12:50pm (Ghosh and Wang)

Wednesday April 2<sup>nd</sup>, 2:15—6:05pm (Fraboni and Mollica)

Thursday April 3<sup>rd</sup>, 9:00am—12:50pm (Guo and Jones)

### Important

Please note that LAB REPORTS are not DUE for the first three experiments; they are due ONLY for the UNKNOWNs. For the first three experiments you will submit LAB QUESTIONS. Follow the table above to submit assignments on time. Late submissions will result in a much lower grade for that particular lab. See below for details on the lab assignments and ASK your instructor if you have doubts.

### Details to Lab Assignments:

**Prelab:** The prelab ensures that you are familiar with the details of the lab experiment beforehand. A prelab is due at the beginning of every lab meeting when a new experiment will be performed, except for today. You must hand in a copy of your prelab at the beginning of the lab period. Your prelab for the first 4 experiments should contain the following 5 sections:

- 1) **Heading:** The heading should include your name, the date, my name, your lab period, and the title of the experiment.

- 2) **Reaction table:** When possible, draw out the reaction(s) to be performed in the experiment. Indicate the name and molecular weight of each reactant. Include a table with the amount (i.e. weight and/or volume), number of moles, and phase (i.e. solid, liquid, or gas) of each reactant.
- 3) **Hazards:** List the hazards associated with this experiment.
- 4) **Precautions:** Explain what will be done to minimize/prevent the hazards associated with this experiment. **Underline or highlight the precautions because they are very important!**
- 5) **Procedure:** Enumerate the sequence of important steps to be done in this experiment. The procedure should be written in the 3<sup>rd</sup> person/passive voice (i.e. avoid using the word "I"). In the prelab, the procedure should be written in the present or future tense, because you are describing something you have not yet done.

*The prelab for the "Identification of Unknowns" experiments will be in a different format, which will be explained at a later date.*

### **Notebook Guidelines**

Keeping a good record of your work is as important as doing good work. The lab notebook is the only valid record of a scientific experiment. A good record means that all important information is recorded accurately in a timely fashion.

Your record should be clear enough for another chemist to understand what you did and to be able to reproduce it following your notes.

You must write your observations as you do your experiments (and include the date at the top of each page). Do not trust your memory. It is very difficult to remember a full lab session after you have finished the experiment; you will always forget details and they may be important.

Use only ink to write in your notebook. NEVER write in pencil.

Try to write as neatly as possible and make sure it is legible for anyone (it doesn't have to look perfect though!). You will certainly make mistakes from time to time; that is normal. When that happens, just cross out the error and write the correct entry in the proper place (the crossed-out error must also be legible).

**Some things you must NEVER do in your book: erase, use liquid corrector, and tear off pages.**

Each entry should contain the following 7 sections:

- 1) **Heading**
- 2) **Reaction table**
- 3) **Hazards**
- 4) **Precautions**

Sections 1-4 are identical to sections 1-4 in the prelab. These sections can be copied directly from your prelab into your notebook.

- 5) **Procedure and Observations:** Summarize the sequence of important steps that were performed. This can be written either as a numerical list or in paragraph form. Record important observations as you go along (i.e. when a reactant was added, was there a color change? or did the solution bubble, indicative of gas evolution?).
- 6) **Data (or Results):** Record any raw data. This can be something you measured (i.e. a weight) or the results of a test (i.e. the results of a litmus test).
- 7) **Conclusions:** Analyze or interpret your data in this section. (i.e. Answer the question: What was the % yield of the product? Or, what does your data suggest your unknown is?)

**Tips:**

- In 5) write your account of what you did (e.g., the solution was heated under reflux for 2h and a color change from blue to yellow was observed; it was then allowed to cool to room temperature and chloroform (10 mL) was added...). Do **not** write what you think or expect will happen (e.g., "The reaction mixture will be heated until the new product precipitates").
- Write only facts, not opinions (e.g. "after heating for 10 min, the red mixture turned black and an intractable black solid was obtained", but never write "the synthesis didn't work" or "crappy black decomposition product". It might be a new compound in fact more interesting than the one you wanted to make in the first place!).

**Lab questions:** For the first four experiments, you will answer the questions that appear in your lab textbook/supplement at the end of the description of each experiment. The answers will be handed in at the beginning of the lab period on the dates listed above.

**Lab report:** For the experiments entitled, "Identification of unknowns" (all 3), three lab reports will be due in weeks 9 (unknown 1); 14 (unknown 2) and 16 (unknown 3). The lab report is an exercise in scientific writing and is in the same general format as a scientific publication.

Lab reports should be written in the 3<sup>rd</sup> person/passive voice (i.e., "ten grams of sodium chloride was added"; not, "I added ten grams of sodium chloride"). Lab reports should be written in the past tense, because you are describing something you've already done.

Lab reports should be typewritten and should contain the following sections:

**Heading:** The heading should include your name, the date, my name, your lab period, and the title of the experiment.

**Introduction:** Briefly describe what chemical principles you used in this experiment.

**Objective:** In this section, briefly and clearly state what the goal of the experiment was.

### **Unknown 1:**

**Procedure:** Summarize the sequence of important steps that were performed in each test. This should be written in paragraph form. There is no need to write a procedure for the acquisition of the melting or boiling point.

**Data (or Results):** This section should contain the raw data from your experiment *without any data analysis*. For example, “a blue precipitate formed” (an observation); not, “nitrogen was present” (an interpretation of your observation).

**Analysis and Discussion:** This section will start with an analysis of the data that you presented in the previous section (i.e. “nitrogen was present”). Next, you must discuss how your data analysis supports what you think your unknown is. For the first unknown, you must assign as many peaks as you can in your  $^1\text{H}$  NMR spectrum. Please attach the  $^1\text{H}$  NMR spectrum to your lab report. Finally, comment on any tests that were inconsistent with what you think your unknown is; if possible, try to offer an explanation for why they were inconsistent.

### **Unknown 2:**

**Procedure:** See above. If you performed a test more than once, refer to the earlier procedure you wrote and comment on the differences, if any. For example, if you are writing about your second unknown, you may wish to say something like, “The sodium fusion test for nitrogen was run as described for unknown #1, except that 2 drops of the liquid unknown were used, instead of 10 mg.”

**Data (or Results):** See above.

**Analysis and Discussion:** See above.

### **Unknown 3:**

**Procedure:** See above.

**Data (or Results):** See above.

**Analysis and Discussion:** See above.

**Conclusions:** In this section, identify your three unknowns. You may only propose one compound as the identity of any given unknown.