



**JOHN JAY COLLEGE OF CRIMINAL JUSTICE**  
**The City University of New York**

**CHEMISTRY 202 ORGANIC CHEMISTRY --- Spring 2013**  
**Sections 1-3**

**Instructor: Gloria Proni**

**Office Location: New Building 5.66.12**

**Contact hours: Tue 11.00 am - 12 pm**

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**Laboratory/Recitation Instructors and their contacts:**

**Laboratory instructors:**

**Dr. Elise Champeil - [echampeil@jjay.cuny.edu](mailto:echampeil@jjay.cuny.edu)**

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**Course Description**

Today's qualified forensic scientist must acquire a capacity for logical reasoning, an imaginative approach to solving problems and a flexibility that allows adaptation to a changing world. CHEM 202 aims to develop these qualities in the area of introductory organic chemistry. Goals of the course are, also, essential experimental laboratory skills and fundamental knowledge in the foundations of organic chemistry.

In particular, CHEM 202 continues the systematic examination of the reactions of the common functional groups that begun in CHEM 201 (Organic Chemistry I). Alcohols, aromatic compounds, aldehydes and ketones, carboxylic acids and their derivatives, amines and few notions on nucleic acids, carbohydrates, and amino acids will be studied. Several lessons will be devoted to various forms of spectroscopy, which is the principal way modern organic chemists find out how the atom and molecule are joined together. The laboratory component of this course consists of fourteen double-John Jay sessions over the semester. The lab work consists of synthesis, purification and analysis of organic compounds. The recitations, held in a single John Jay period weekly, will be dedicated to explaining difficult topics, answering student questions, reviewing the material discussed in the lectures.

## Learning Outcomes

Assessed by: exams' and laboratory's performances and/or evaluation of notebook data and lab reports and/or lab tests.

The student will demonstrate the ability to use the appropriate problem-solving techniques to solve a scientific problem such as an organic synthesis comprised of one or more steps, or a determination of the structure of a compound based on spectroscopy (IR, NMR, MS) and/or chemical evidence.

When conducting a laboratory experiment, the student will follow written procedures commonly used in the organic lab (such as reflux, distillation, extraction, recrystallization, and melting-point determination) accurately and safely. When completing a lab report, the student will apply the scientific method correctly by being able to state a hypothesis, take careful measurements, estimate uncertainties and draw appropriate conclusions based on gathered data and scientific principles.

The student will explain observable phenomena using appropriate scientific theories, such as writing a reaction mechanism consistent with observed facts or utilizing appropriate structures to represent different types of organic molecules and species.

### Reasoning

- Predict the major product in an organic reaction, such as those involving carbonyl, amino, allyl, or aromatic groups.
- Write synthetic schemes for the production of different classes of these compounds.
- Analyze spectroscopic data to solve the structures of organic compounds.
- Perform retrosynthetic analysis.
- Analyze spectroscopic data to solve the structures of organic compounds.
- Predict the optical activities and stereochemistry properties for different classes of compounds.

### Knowledge

- Recognize main functional groups in organic compounds.
- Name organic compounds using the IUPAC nomenclature.
- Recognize nucleophiles, electrophiles and their reactivity in order to predict the course of a reaction.
- Interpret laboratory instructions, safety sheets and experimental protocols.
- Define the structures and properties of organic compounds.
- Describe basic organic chemistry mechanisms ( $S_N1$ ,  $S_N2$ ,  $E_1$ ,  $E_2$ , ...).
- Explain the theory behind basic spectroscopic methods.
- Use appropriate current technology in the laboratory to obtain data and understand the impact that recent technologies have on the field.

### Practical skills

- Apply basic synthetic skills.
- Illustrate basic spectroscopic techniques:
  - Standardize and operate laboratory instruments to identify reactants and products and to separate mixtures of compounds.
- Obtain information about chemical compounds from all possible sources;
  - Apply this information for the safe handling, use and disposal of such compounds in a safe and environmentally responsible manner

### Communication

- Give small presentation on organic compounds.
- Prepare laboratory reports in accordance with current forensic reports' styles.

## Course prerequisites or co-requisites

CHE 201 and all the pre- and co- requisites for CHE 201

## Requirements / Course Policies

Students enrolled in this course are **required** to attend all lecture, recitation, and laboratory sessions of the section for which they registered. There are two lecture sessions, one recitation session, and one laboratory session per week. If a student needs to miss lecture classes he/she may do so, but the instructor may ask to withdraw from the course. More than 3 absences in the labs, lectures or recitation classes will result in an unofficial withdrawal grade. The information missed is vital to your future profession. Attendance, enthusiasm, and active class participation are observed, recorded, and reflected in the student's final grade. Late arrival to the lab WILL NOT be tolerated (students will be penalized if late): such behavior has direct consequences upon the safety in the lab. Attendance is taken solely from roll sheets circulated at the beginning and/or end of each session or by the clickers. Lateness or early departure counts as ½ absence. Students missing more than 30 minutes of a session will be counted as absent. Obviously there is no penalty for students when classes are canceled.

## Required Texts

### Lecture Text:

*Organic Chemistry, 10<sup>th</sup> Edition, by Solomons, John Wiley and Sons, Incorporated 2009*

You have the flexibility of buying the book in different formats, each at different prices.

The ISBN of the cheapest version with WileyPlus is 9780470932742: this is the binder-ready version of the textbook with a WileyPLUS code.

**Do not throw away the WileyPlus registration card**, as resources found in WileyPlus will be used in class and homework will be assigned online.

### John Jay Bookstore

- 1.) Text with WileyPlus,  
(standard version of the book packaged with WileyPlus)
- 2.) BinderReady Text with WileyPlus,  
(3 hole punched, color pages, just like the regular book, without the binding. You can carry chapters with you to class or insert in a binder of your choice)

### www.wileyplus.com

- 3.) WileyPlus (buy directly online from www.wileyplus.com)  
(Here you do not get a physical book, just access to online ebook, all learning tools, and homework problems. )

### Lab Manual: (The lab manual must be brought to each laboratory session.)

*Introduction to Organic Laboratory Techniques: A Microscale Approach, 4th Edition*  
Donald L. Pavia | Gary M. Lampman | George S. Kriz | Randall G. Engel

**Necessary for recitation and during the lecture exams:** Molecular structure models [the instructor recommend models from HGS Molecular Structure but you are free to get different models that satisfy you].

**Other required material (to be brought to each laboratory session):**

Splash-resistant safety goggles or safety glasses meeting the ANSI Z87.1-1989 standard. All students must wear safety glasses or goggles in lab. Students requiring corrective lenses must wear safety glasses or goggles over the corrective lenses.

A non-programmable scientific calculator that can be removed from its case (available at most electronic stores).

The library (212-237-8200) owns several copies of the textbook and so does the Math and Science Tutoring center (646-557-4595). In addition, videos have been recorded of the majority of the lecture classes, for your review, in case you have missed classes. They are available in the Math and Science Tutoring Center.

## Grading

This course has three components -- lecture, recitation, and laboratory. Each component has a separate grading policy, which contributes a percentage to the overall course grade. In general, the course grade is the sum of the grades earned in the lecture (60%) recitation (5%) and laboratory (20%) sessions and ACS exam (5%). 10% of the grade is based on the homework given online. Since the lab sessions are an integrated component of the course, where lab safety skills and dexterity are taught for use in subsequent science courses, for safety reasons, a minimum lab grade of 60% is required to pass the course. Recitation is graded based on participation and attendance (5%). In order to pass the Organic Chemistry course, a minimum lecture grade of 60% is required.

**Lecture:** During the lecture sessions, three partial exams are given (each of them counts 33% of the lecture grade and last 1 hour and 05 minutes). **There are no make-up exams.** Unexcused absences from exams will result in a grade of zero. Excused absences will not lead to a penalty but remaining exams will be weighted correspondingly more. Missing three (3) exams automatically constitutes a grade of F for the course. During the final exam's week the American Chemical Society (ACS) standardized test (which lasts two hours) is given which counts as 5% of the final grade in the course. It is a cumulative exam and it needs to be taken in the date/time indicated by the instructor (ACS regulation). If a student miss the ACS standardized test in the final week of exams and he is passing the course up to that point, he will receive a grade that correspond to the average of the other exams. If he is missing the ACS exams during the final week of exams and he is not passing the course up to that point a grade of "F" will be assigned. **THERE WILL BE NO MAKE-UPS OF THE ACS EXAM or OF ANY OTHER EXAMS.** It is important to understand that it is **students' responsibility** to come to class and take the exams. During the exams books remain closed. A non-programmable, scientific calculator may be used during exams if it is removed from its case. Molecular Models may be used.

**Recitation and Homework:** During the recitation sessions, students are encouraged to participate in discussions and activities related to the lecture material and homework. Active participation by all students benefits all students, providing varying approaches to mastering the subject material, incentive, and progress evaluation. Consequently, absences or failure to meaningfully participate will result in a course grade penalty. Students' grade will be based on the online homework assigned by the instructors (10%) and participation/attendance in the recitation class (5%). Students, during recitation and lecture sessions, are required to come to the board and do exercises in front of their colleagues in order to get credit for their participation. No computer-based homework will be corrected or graded if handed in a paper copy.

### **Laboratory:**

Laboratory grades will be determined based on performance on weekly laboratory reports, pre-lab quizzes and a laboratory final exam. To account for individual differences in grading by instructors, the final laboratory grade will be normalized according to a collective grade average. This means the that final numerical score given by one's individual lab instructor is subject to change by a few percentage points before it is factored into your overall organic chemistry course grade.

Laboratory absences can sometimes be unavoidable. Absences must be pre-arranged and must be made up or will result in a zero for that lab. The **ONLY** excused absences are ones that can be documented by a doctor's note, accident report, jury summons, religious explanation from official, etc. The document must contain contact information to confirm the reason for the absence and a signature.

**All other absences are unexcused and no make-up labs will be given.** The note must be submitted no more than **two weeks** after the absence. Any **UNEXCUSED** absences will result in a zero for that day with no exceptions. **More than 1 unexcused absence or more than 2 excused absences will result in a failing grade for the semester.**

Pre lab questions	8-15 points	
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Post lab questions	8-15 points	
Safety	5-10 points	References must be included.
Results/observations	15-25 points	All results must be clearly stated and all observations recorded.
Calculations	5-15 points	Correct units must be used. All yields must be reported. All numbers must be explained
Explanation/discussion/conclusion	30-50 points	This is a crucial part of the lab report. Detailed explanations of all your results and observations must be included. Your writing must be concise and easy to understand. The conclusion has to be thorough and you must demonstrate that you understood the principles of the lab.

Remember: **There is no wrong or right.** If results are different from what is expected DO NOT INVENT. Instead, try to find logical explanations for what happened. This will be taken into account and your grade will not suffer from it, as long as you provide a reasonable justification. This is the opportunity to develop your critical thinking abilities and your writing skills.

Reports written by Forensic Scientists must be clear, concise, and unambiguous. Consequently, when a question in the test/quiz/laboratory report assigned requires a written explanation, spelling, grammar, and clarity of expression will be considered in determining the "correctness" of the answer proffered. It is important that careful attention is directed to writing what you mean and meaning what you write. If the grade on the first two laboratory reports is below B, students will be referred to the Writing Center Services (212-237-8659).

Lab materials such as pre-lab and post-lab questions are no longer distributed at the beginning of lab class. They are posted on Blackboard in the "lab presentations" tab in CHE 202. It is the student's responsibility to download the materials and print them each week.

**College Wide Policies for Undergraduate Courses** (see the Undergraduate Bulletin, Chapter IV Academic Standards)

**Americans with Disabilities Act (ADA) Policies**

Sample syllabus statement: "Qualified students with disabilities will be provided reasonable academic accommodations if determined eligible by the Office of Accessibility Services (OAS). Prior to granting disability accommodations in this course, the instructor must receive written verification of a student's eligibility from the OAS which is located at L66 in the new building (212-237-8031). It is the student's responsibility to initiate contact with the office and to follow the established procedures for having the accommodation notice sent to the instructor."

Source: *Reasonable Accommodations: A Faculty Guide to Teaching College Students with Disabilities*, 4<sup>th</sup> ed., City University of New York, p.3.  
 ([http://www.jjay.cuny.edu/studentlife/Reasonable\\_Accommodations.pdf](http://www.jjay.cuny.edu/studentlife/Reasonable_Accommodations.pdf))

### **Statement of the College Policy on Plagiarism**

Plagiarism is the presentation of someone else's ideas, words, or artistic, scientific, or technical work as one's own creation. Using the ideas or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations require citations to the original source.

Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism.

It is the student's responsibility to recognize the difference between statements that are common knowledge (which do not require documentation) and restatements of the ideas of others. Paraphrase, summary, and direct quotation are acceptable forms of restatement, as long as the source is cited.

Students who are unsure how and when to provide documentation are advised to consult with their instructors. The Library has free guides designed to help students with problems of documentation. (*John Jay College of Criminal Justice Undergraduate Bulletin*, <http://www.jjay.cuny.edu/academics/654.php>, see Chapter IV Academic Standards)

### **Ethics**

Ethics principles in chemical research will be discussed during the lecture sessions.

### **Tutoring**

Although a considerable amount of remediation is done during the recitation portion of the course, when necessary the Science Department generally provides -- on a first come, first served basis -- tutoring to students requesting such help at the Math and Science Tutoring Center. Scheduled weekly appointments are encouraged. "Crash" sessions immediately before a quiz or exam are discouraged. Although participation in these sessions is not required, most students find them helpful. There is no charge for tutoring.

**Course Calendars: in this order lecture, laboratory and recitation:** these topics and dates are indicative and may change. Please be aware of it.

SESSION	DATES	TOPICS	CHAPTER	HOMEWORK
January/February				
1	29	Alcohol and Ethers	11	Wiley Plus – 1 <sup>st</sup> Assignment – not graded
2	31	Alcohol and Ethers	11	
3	05	Alcohol and Ethers	11	
4	07	Alcohols from Carbonyl Compounds	12	Wiley Plus – 2 <sup>nd</sup> Assignment – graded.
5	14 <sup>^</sup> Tuesday schedule	Alcohols from Carbonyl Compounds	12	
6	19	Alcohols from Carbonyl Compounds	12	
7	21	TEST 1		
8	26	Conjugated Unsaturated	13	Wiley Plus – 3 <sup>rd</sup> Assignment.

		Compounds		
9	28	Aromaticity	14	Wiley Plus – 4 <sup>th</sup> Assignment.
March				
10	05	Aromaticity		
11	07	Reaction of Aromatics Compounds	14	Wiley Plus – 5 <sup>th</sup> Assignment.
12	12	Reaction of Aromatics Compounds	15	
13	14	Aldehydes and Ketones	16	
14	19	Aldehydes and Ketones	16	Wiley Plus – 6 <sup>th</sup> Assignment.
15	21	TEST 2		
	3/24-4/2	Spring Recess		
APRIL				
16	4	Aldehydes and Ketones	16	
17	9	Aldehydes and Ketones	17	
18	11	Aldehydes and Ketones	17	Wiley Plus – 7 <sup>th</sup> Assignment.
19	16	Carboxylic Acids and their derivatives	18	
20	18	Carboxylic Acids and their derivatives	18	Wiley Plus – 8 <sup>th</sup> Assignment.
21	23	Carboxylic Acids and their derivatives		
22	25	Carboxylic Acids and their derivatives – Synthesis and Reactions of Dicarboxyl Compounds	18/19	
23	30	Synthesis and Reactions of Dicarboxyl Compounds	18/19	Wiley Plus – 9 <sup>th</sup> Assignment.
MAY				
24	02	Amines	20	
25	07	Amines	20	Wiley Plus – 10 <sup>th</sup> Assignment.
26	09	Phenols and Aryl Amines	21	
27	14	Phenols and Aryl Amines	21	
28	16	TEST 3		Wiley Plus exercises needs to be completed
Final Week		<b>ACS STANDARDIZED EXAM – NO MAKE UPS ALLOWED</b>		Please be aware that for this exam all sections should meet at the same time in the same day (ACS regulation)

TUESDAY	THURSDAY	EXPERIMENT	PROCEDURE PAGE	REQUIRED READING
1/29	1/31	Check - In, Lab Safety, Procedures, Glassware	N/A	Techniques 1, 2, 3, 4, 29
2/5	2/7	Exp 54 C, D, H Tests for	448 - 454, 466	Techniques 10

		Organic Substances: Unsaturation Alcohols	- 468, 474, 488 - 489	
2/14 <sup>^</sup> TUE SCH	2/21	<b>Exp. 38A</b> Triphenylmethanol Preparation of Grignard Reagent	317 - 324	Technique 7.5, 7.6
2/19	2/28	<b>Exp. 38A</b> Triphenylmethanol Workup and IR analysis	323 - 324	Technique 25
2/26	3/7	<b>UV-Vis</b> Lab	Handout	Handout/Techniques 11.3, 11.7
3/5	3/14	<b>Multistep A, B</b> Synthesis of Acetanilide and 4-Bromoacetanilide	Handout	Handout/Techniques 11.3, 11.7
3/12	3/21	<b>Multistep C</b> Synthesis of 4-bromo-2- chloroacetanilide	Handout	Technique 7.8
3/19	4/4	<b>Multistep D</b> Synthesis of 4-bromo-2- chloroaniline	Handout	Technique 25
4/9	4/11	<b>Exp 13A</b> Isopentyl Acetate Preparation through Workup	103 - 105	Essay "Esters – Flavors and Fragrances" pages 99 Techniques 5, 6, 7.2 – 7.4, 12, 13, 14
March				
4/16	4/18	<b>Exp 13A</b> Isopentyl Acetate Distillation and IR analysis	105	Technique 14, 25 pages 833 – 838, 849 - 867
4/23	4/25	Preparation of Phencyclone	Handout	Handout / Techniques 6, 7.2
4/30	5/2	<b>Synthesis A, B</b> Lidocaine I	Handout	Handout / Technique 6, 7
5/7	5/9	<b>Synthesis C</b> Lidocaine II	Handout	Technique 7.2
5/14	5/16	<b>Lab Final</b> , Check out	N/A	Review all materials

\* 14 Feb 2013 (JJAY Tuesday) \*\* NO LAB: 2/12, 3/26, 3/28, 4/2 of 2013

TUESDAY	THURSDAY	MATERIAL TO BE REVIEWED
1/29	1/31	
2/5	2/7	
2/14 <sup>^</sup>	2/21	TEST 1
2/19	2/28	
2/26	3/7	
3/5	3/14	
3/12	3/21	TEST 2
3/19	4/4	
4/9	4/11	
4/16	4/18	TEST 3
4/23	4/25	
4/30	5/2	
5/7	5/9	
5/14	5/16	TEST 4

2/14 Tuesday Schedule